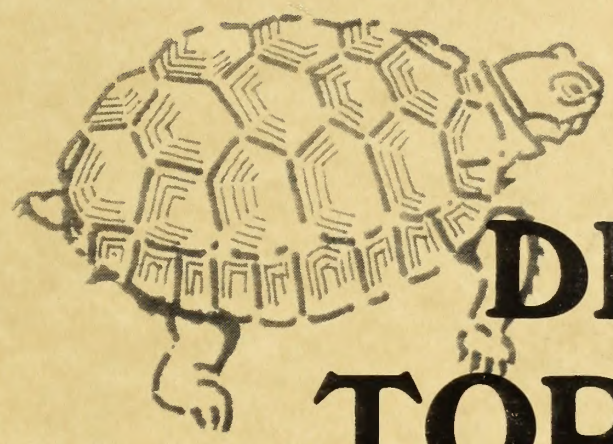
BLM LIBRARY
88049930

6500

MANAGEMENT of DESERT TORTOISE HABITAT



BUREAU OF LAND MANAGEMENT

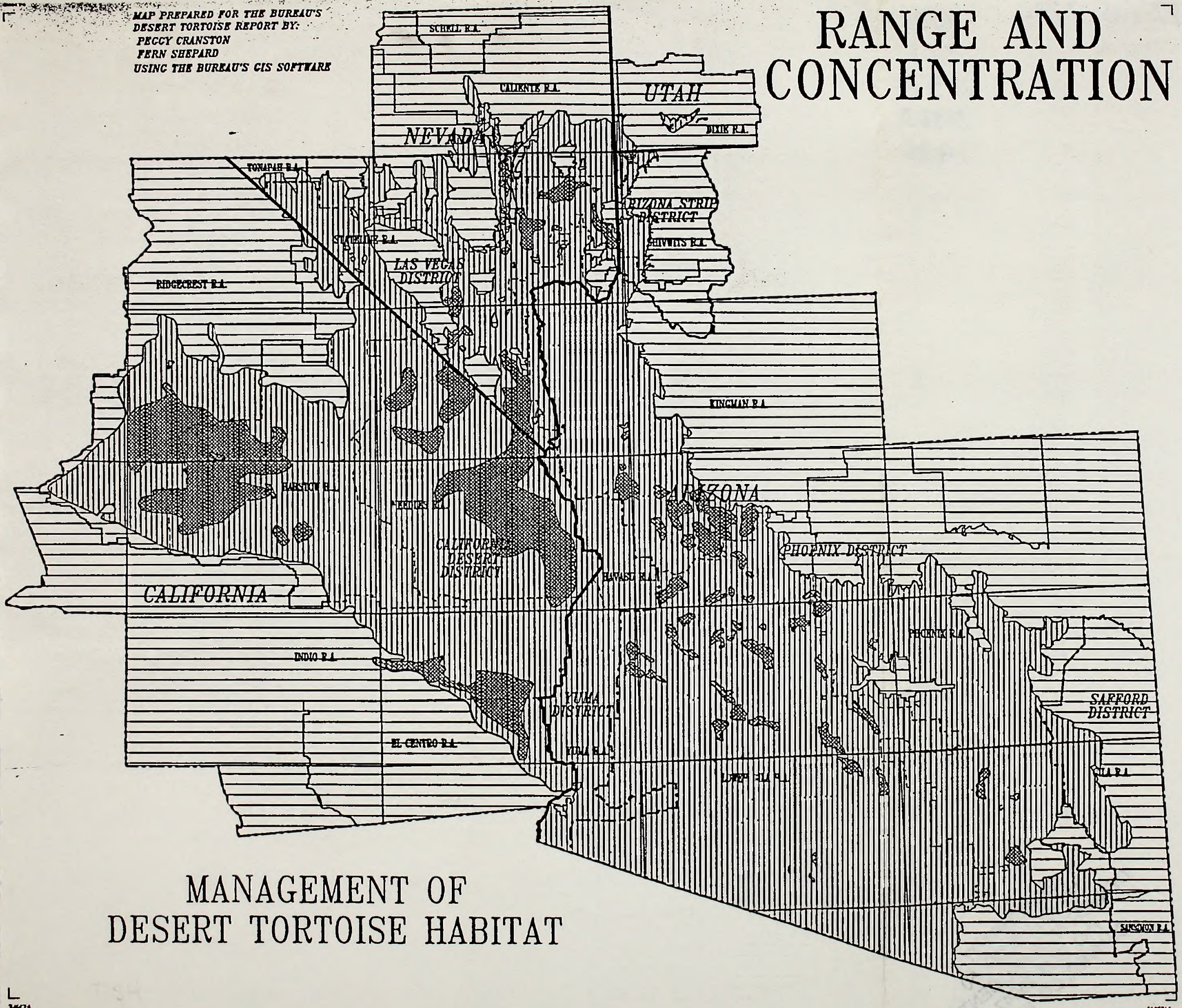
A report to the BLM Chief, Division of Wildlife and Fisheries in Washington, D.C.

QL
666
.C584
M363
1986

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

RANGE AND CONCENTRATION

MAP PREPARED FOR THE BUREAU'S
DESERT TORTOISE REPORT BY:
PEGGY CRANSTON
FERN SHEPARD
USING THE BUREAU'S GIS SOFTWARE



MANAGEMENT OF DESERT TORTOISE HABITAT

N

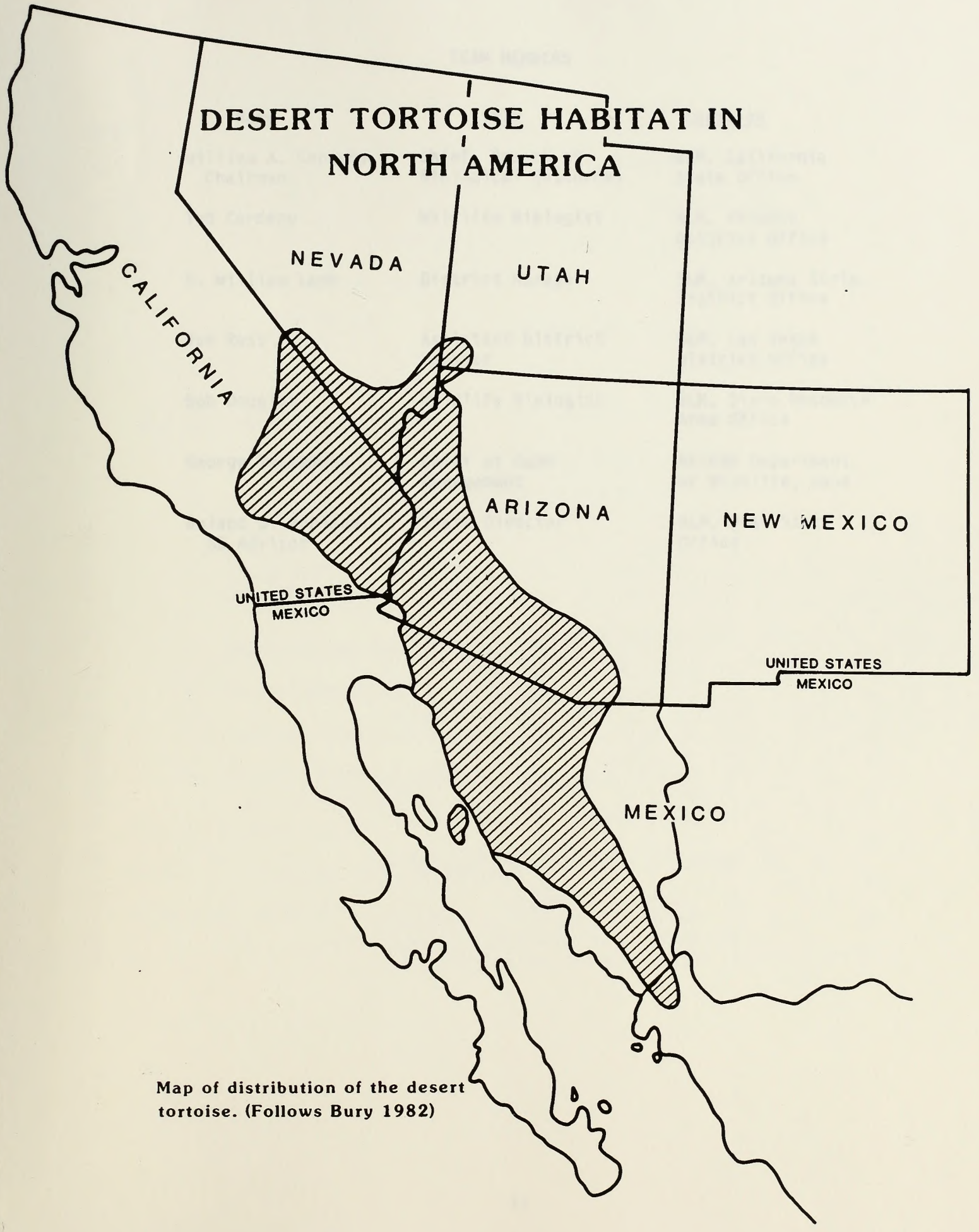
0 2.5 0 MILE 0 2.5

0 2.5 0 0 2.5 KILOMETER

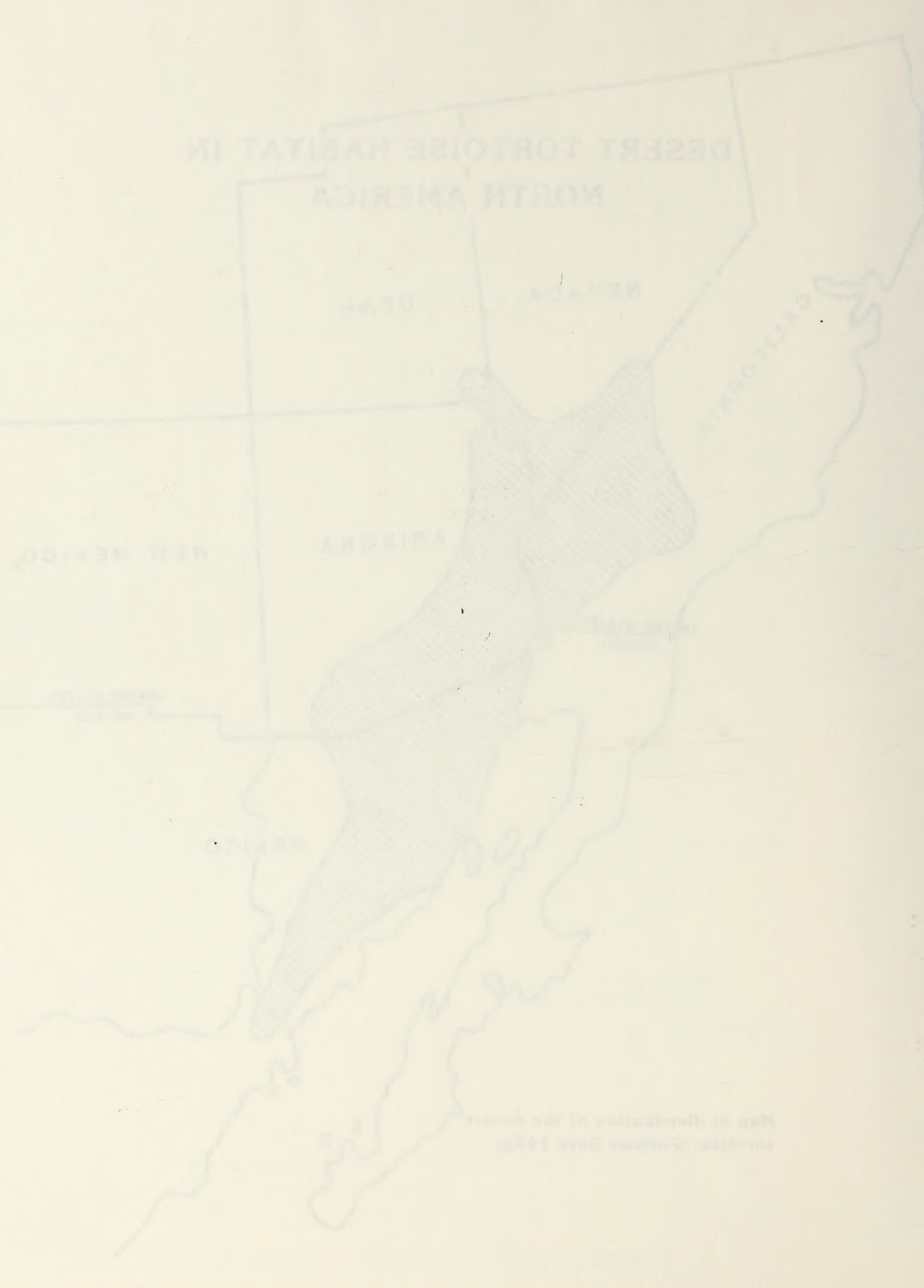
HABITAT
CRUCIAL
NOT.HABRES
STATE.L
DISTRICT.L
RESOURCE.L

TORTOISE RANGE
CONCENTRATION AREA
NOT HABITAT RANGE
STATE BOUNDARY
DISTRICT BOUNDARY
RESOURCE AREA BOUNDARY

BUREAU of LAND MANAGEMENT – CALIFORNIA STATE OFFICE



Map of distribution of the desert tortoise. (Follows Bury 1982)



TEAM MEMBERS

Name	Title	Location
William A. Kennedy, Chairman	Chief, Branch of Biological Resources	BLM, California State Office
Ted Cordery	Wildlife Biologist	BLM, Phoenix District Office
G. William Lamb	District Manager	BLM, Arizona Strip District Office
Joe Ross	Assistant District Manager	BLM, Las Vegas District Office
Bob Douglas	Wildlife Biologist	BLM, Dixie Resource Area Office
George Tsukamoto	Chief of Game Management	Nevada Department of Wildlife, Reno
Roland G. Robison, SD Advisor	State Director	BLM, Utah State Office

TABLE OF CONTENTS

		Page
	EXECUTIVE SUMMARY	v
I.	INTRODUCTION	1
	A. Overview	1
	B. Goal	2
	C. Purpose of This Report	2
II.	BACKGROUND	2
	A. Range and Life History	2
	B. Population and Habitat Status	3
	C. BLM Planning and Management History by State	5
	1. Utah	5
	2. Nevada	6
	3. California	9
	4. Arizona	12
	D. Impacts and Management Actions	15
	1. Off-road Vehicles	15
	2. Livestock and Burros	16
	3. Land Use Authorizations/Tenure	16
	4. Collection, Shooting and Vandalism	17
	5. Predators	18
	6. Mineral Exploration and Development	18
	7. Wildfire	19
	8. State Summary of Impacts	19
	E. Research, Inventory, and Monitoring	20
	1. Inventory Techniques	21
	2. Monitoring Study Plot Techniques	21
	3. Analyses of Inventory and Study Plots	23
	4. Other Studies and Research	23

Page

III. EXISTING LAWS AND GUIDANCE 24

A. Federal Laws and Guidance 24

1. Federal Laws 24
2. Executive Orders 24
3. BLM Manual 25
4. Code of Federal Regulations (CFR) 25

B. State Laws and Guidance 25

1. California 25
2. Nevada 27
3. Utah 27
4. Arizona 28

IV. FINDINGS AND RECOMMENDATIONS 29

A. Provide Coordination Through an Oversight Group 30

B. Standardize Inventory, Monitoring, and Analytical Procedures 31

1. Inventories 31
2. Monitoring 32
3. Analysis 32

C. Designate and Categorize Management Areas 32

D. Conduct Additional Research and Studies 34

E. Increase Public Information Efforts 34

F. Provide Increased Emphasis on Tortoise Habitat Management 35

V. LITERATURE CITED 36

APPENDIX 1. EXISTING LAWS AND GUIDANCE 38

APPENDIX 2. RESEARCH AND STUDIES 48

EXECUTIVE SUMMARY

The Bureau of Land Management (BLM) recognizes the desert tortoise (Gopherus agassizii) as a natural part of the Mojave and Sonoran Desert ecosystems. In meeting its responsibilities for management of the tortoise and its habitats in concert with other multiple uses on the public lands, the Bureau acknowledges that such multiple uses can have detrimental effects on the species. BLM has taken actions to mitigate man-caused impacts and to protect tortoise habitats. These actions, however, were not coordinated between states by either the state wildlife agencies or the BLM. Increased public concern and a need to manage the desert tortoise and its habitat more effectively resulted in establishing a special Task Force in FY 1986 to develop a framework for BLM management. This framework is to provide a consistent approach throughout the species' range and an atmosphere where state and Federal agencies and all interested parties may work together for the benefit of the species.

In the United States the desert tortoise is found in many scattered locations in extreme southwestern Utah, southern Nevada, southeastern California, and western and central Arizona (see maps). On BLM-administered lands, the known distribution of desert tortoises has been identified in each of these states. The Bureau administers about 63 percent of the 75,880 square miles within the range of tortoise habitat and 88 percent of 9,640 square miles of crucial tortoise habitat (Table 1).

It is the Bureau's goal to ensure that viable desert tortoise populations exist on public lands. In order to determine the status of the desert tortoise throughout its range, a great deal of scientific research, inventory, and monitoring has been conducted, primarily since 1970. BLM has been a major funding source for this data gathering effort, but significant contributions have also been made by numerous state agencies, other Federal agencies, private organizations, and academic institutions. The study effort has included the establishment of over 3,700 transects (5,000+ linear miles) and about 45 permanent study plots (Table 3), some of which are monitored on a 5-year cycle. These transects and plots are used for both basic research and monitoring.

Data collected to date have been instrumental in two actions by the U.S. Fish and Wildlife Service (FWS) relating to protection of the desert tortoise pursuant to the Endangered Species Act of 1973, as amended (ESA). In 1980 the Beaver Dam Slope tortoise population in southern Utah was listed as threatened pursuant to section 4 of the ESA. In response to a September 1984 petition to list the species throughout its range, the FWS issued a finding that such listing is warranted, but is "precluded by other pending proposals of higher priorities . . . ."

In spite of these FWS actions, in some areas tortoises are still found in large numbers (up to 450 per square mile). Though a rangewide estimate of the total number of desert tortoises is difficult to make with any accuracy, based on known tortoise densities and extent of tortoise habitats a minimum of 480,400 and a maximum of 2,559,600 tortoises are projected to exist today. This includes 400-3,700 in Utah, 50,900-603,900 in Nevada, 352,000-1,051,900 in California, and 77,100-900,100 in Arizona.

The Bureau's consideration of high value tortoise habitat increased significantly during the late 1970's and 1980's and is still increasing. In Utah the Management Framework Plan (MFP) concerning the desert tortoise was completed in 1977 and includes establishment of the 3,040-acre Woodbury Desert Study Area. Subsequently, Allotment Management Plans (AMP) (livestock) and a Habitat Management Plan (HMP) (wildlife) have been developed to implement this MFP to the benefit of the Beaver Dam Slope population. In Nevada the desert tortoise and its habitat continue to receive high priority consideration by BLM. Through implementation of several MFPs, Coordinated Resource Management Plans (CRMP), and associated AMPs and HMPs, Nevada BLM manages tortoise crucial habitat within a multiple-use framework and in cooperation with the Nevada Department of Wildlife.

The major impetus for desert tortoise habitat management in California was provided by completion of the California Desert Conservation Area (CDCA) Plan in 1980. Management policy for the tortoise pursuant to this plan is based in part on tortoise densities within eight specific crucial habitat areas, so that areas with significant tortoise densities in general receive the highest priority for management and protection. Five HMPs and three Area of Critical Environmental Concern (ACEC) Management Plans have been or will be developed for these areas. Other actions prescribed by the CDCA Plan also benefit tortoises, including better control of ORV use, increased ranger patrol in crucial tortoise habitats, removal of wild burros, livestock grazing restrictions, acquisition of tortoise habitats, and mitigation of the effects of development activities. The Bureau in California is committed to managing and protecting the desert tortoise and to ensuring survival of viable tortoise populations using the principles of multiple-use management.

In Arizona desert tortoise habitats are managed primarily through implementation of MFPs, Resource Management Plans (RMP), AMPs, HMPs, and wilderness designations. In most Arizona Districts nearly all provisions for desert tortoise habitat management involve livestock management. Arizona BLM is also a contributing member of the Arizona Interagency Desert Tortoise Team, which is currently preparing a statewide research and management plan for the species.

In all four states there is a lack of quantification of the effects of most impacts on desert tortoises. Impacts include ORV use; livestock grazing; proliferation of roads, rights-of-way, and other linear use authorizations; land tenure (ownership) problems; collecting, shooting, and vandalism; predators; urbanization; mineral development; agriculture; disease; and wildfire and fighting wildfires. The actual severity of each of these impact types varies greatly from area to area, and there are many data gaps.

In an effort to demonstrate even greater initiative in managing the desert tortoise and its habitat on public land in Utah, Nevada, Arizona, and California, the Desert Tortoise Task Force recommends the following:

A. Establish a Desert Tortoise Oversight Group consisting of representatives from FWS Regions I, II, and VI; BLM offices from each of the four involved states; the four involved state wildlife agencies; and BLM's Washington Office. Technical committees or other coordination mechanisms are also recommended on a state-by-state basis.

B. Establish a standardized process of data analysis and interpretation in order to utilize existing information to the greatest extent possible.

C. Categorize all desert tortoise habitat into three categories based on population levels, habitat conditions, and manageability.

D. Provide funding for desert tortoise research through the Bureauwide Research Program and other non-Bureau sources.

E. Educate public land users and adjacent landowners about the tortoise and its habitat needs.

F. Obtain funding for actions to benefit desert tortoises according to the following priorities: 1) implementation of management actions, inventory of areas where no inventory exists, categorization of habitats, and monitoring; 2) analysis of existing data; 3) new research and studies; and 4) public information and technology transfer.

These recommendations also carry the concurrence of the BLM State Directors involved.

I. INTRODUCTION

A. Overview

The Bureau of Land Management (BLM) recognizes the desert tortoise (Gopherus agassizii) as a natural part of the Mojave and Sonoran desert ecosystems. Tortoise habitat extends from as far north as southwestern Utah south to Sinaloa, Mexico. Habitat in the United States is in Arizona, California, Nevada, and Utah, primarily on lands administered by the U.S. Department of the Interior, Bureau of Land Management.

A great deal of information has been compiled on the tortoise, but much is still unknown about population trends and habitat requirements. Some studies indicate that certain populations are declining, while the status of others is unknown. However, multiple uses on public lands, if not managed properly, can have a detrimental effect on desert tortoise populations.

In 1980 the Beaver Dam Slope tortoise population in southern Utah was listed by the U.S. Fish and Wildlife Service (FWS) as threatened. In September 1984 the FWS was petitioned to list the species as endangered throughout its range. On 18 September 1985, the FWS issued a finding that "listing of the desert tortoise throughout its range is warranted, but precluded by other pending proposals of higher priority . . . ." The FWS has stated that sufficient data may not exist to accurately determine status throughout the species' range.

To ensure that adequate management consideration is being given to the desert tortoise, known data must be fully analyzed and interpreted, and additional knowledge of desert tortoise populations and habitat requirements must be gained. Gathering and utilizing existing and new information will require continual coordination and consultation with state wildlife agencies, other Federal agencies, universities, and interest groups. Information exchange must also take place between the United States and Mexico.

It is Bureau policy to conserve federally and state-listed endangered or threatened animals and plants and to utilize its authorities in furtherance of the purposes of the ESA and similar state laws. It is also Bureau policy to ensure that the crucial habitats of sensitive animals are managed and/or conserved to minimize the need for listing those animals by either Federal or state governments in the future.

The following process was used in the preparation of this report. Team members were selected by the BLM Chief, Division of Wildlife and Fisheries in the Washington Office with the concurrence of the State Directors involved (see page ii for a list of team members). Initial drafts were prepared and reviewed internally by BLM. Later drafts were distributed to private organizations and groups, interested individuals, and state and other Federal agencies. BLM State Directors were involved throughout the process in a review capacity.

B. Goal

It is the Bureau's goal to manage habitat so as to ensure that viable desert tortoise populations exist on public lands. This will be accomplished through cooperative resource management aimed at protecting the species and its habitat.

C. Purpose of This Report

This report is intended 1) to provide BLM with a framework and consistent approach for managing the desert tortoise and its habitats throughout the species' range within the United States, 2) to establish an atmosphere where state and Federal agencies and all interested publics are working together for the benefit of the species, and 3) to recognize current management actions which are being taken for the benefit of the species.

II. BACKGROUND

A. Range and Life History

Information for this section was obtained primarily through a questionnaire sent to each BLM State Office involved, as well as from BLM District Offices and state wildlife agencies.[1/]

In the United States the desert tortoise in its natural environment is found in many scattered locations in southwestern Utah, southern Nevada, southeastern California, and western and central Arizona (see maps). The life history and ecology of the species is well documented in other sources and will not be treated here in detail. Densities of desert tortoise populations vary greatly across the species' range in the United States. On public lands administered by BLM, desert tortoise populations with moderate to high densities (20 or more per square mile) have been identified in each of these states. Habitats of such populations are often treated as crucial habitats[2/] for management purposes. One population in southern Utah is listed by the U.S. Fish and Wildlife Service as threatened

---

1/ Data used in the report and depicted on the map have been assembled from a variety of sources to provide a regional overview. This information is intended only to portray the overall situation in general. It is not to be construed to precisely reflect specific local conditions. Additionally, it does not necessarily resolve questions of conflicting data, accuracy of data, or differing levels of detail. Acres and population numbers have been derived from a computerized geographical information system.

2/ "Crucial habitat" includes portions of the habitats of officially designated BLM sensitive species that if destroyed or adversely modified could result in their being listed as threatened or endangered pursuant to section 4 of the Endangered Species Act of 1973, as amended, or in some category implying endangerment by a state agency or legislature. (BLM Manual Section 6840, Glossary, Page 1.) When the "category" concept (see Recommendation C, p. vii) is implemented, the term "crucial habitat" will no longer be used in relation to tortoise habitat on the public land.

and is protected under the Endangered Species Act of 1973, as amended. Moderate to high density (crucial and critical)[1/] habitats occupy approximately 9,680 square miles of public lands: 50 in Utah, 860 in Nevada, 6,940 in California, and 1,830 in Arizona (Table 1).

Large numbers of desert tortoises also exist in captivity.

B. Population and Habitat Status

The following estimates of total desert tortoise numbers are for the purpose of quantifying the order of magnitude of total numbers. Depending on the assumptions made in calculating such estimates, the differences between maximum and minimum numbers can be great. Population estimates are shown in Table 2.

The desert tortoise occurs in a wide array of habitat types, and descriptions vary greatly in specificity from area to area. No one has successfully rated tortoise habitat quality, trend, or condition other than on a gross scale. Information is not readily available on other than population or sign frequency data. In general, tortoises of the Mojave and Colorado deserts occur in valleys and plains with low relief at elevation below 4,000 feet. The tortoise in the Sonoran Desert of Arizona is generally an inhabitant of rocky bajadas and often steep slopes. Relating tortoise-habitat relationships has been attempted in California, and validation of the model will be initiated in 1987. No such work has been successfully accomplished in other states. As discussed in the conflict/impact section, many uses may affect tortoise habitat on a site-specific basis. All conflicts do not occur everywhere.

The measurement of tortoise habitat quality or condition relates to tortoise densities or other parameters, such as sex ratios, size-age structure, and population trends. Other factors, such as collection, vandalism, disease, or predators, also influence populations. Tortoise densities vary between 1 and 450 per square mile, but are usually at the lower end of the scale over most of the species' vast range.

Population trend has been determined at some sites. The following are some examples.

In Utah long-term population trend indicators led to listing the tortoise as threatened, In California a population decline of 34 percent over a 6-year period was found at the periphery of the Desert Tortoise Natural Area (DTNA), while density at a control plot well within the DTNA did not change. The Fremont Peak population has declined even more over eight years. BLM has received funding from California Department of Fish and Game to analyze data related to tortoise trends in the CDCA. The large Fenner-Chemehuevi Crucial

---

[1/] "Critical habitat" refers to an area designated as critical habitat and listed in 50 CFR Parts 17 or 226 which implement section 4 of the Endangered Species Act of 1973, as amended.

Table 1. Tortoise habitat by state.[1/]

	Total Habitat (Sq. Mi.)	(Acres)	Percent BLM	Total Crucial Habitat (Sq. Mi.)	(Acres)	Percent BLM	Total Critical Habitat (Sq. Mi.)	(Acres)
Utah	170	(108,800)	65%	10	(6,400)	100%	40	(25,600)
Nevada	8,800	(5,632,000)	77%	860	(550,440)	94%		
California	24,650	(15,776,000)	63%	6,940	(4,441,600)	70%		
Arizona	42,260	(27,046,400)	60%	1,830	(1,171,200)	90%		
TOTALS	75,880	(48,563,200)	63%	9,640	(6,169,600)	88%	40	(25,600)

Table 2. Estimated desert tortoise numbers.[2/]

	Minimum	Maximum
Utah	400	3,700
Nevada	50,900	603,900
California	352,000	1,051,900
Arizona	77,100	900,100
TOTAL	480,400	2,559,600

[1/] It is important to recognize that while Table 1 and the maps refer to continuous habitat and tortoise densities, such habitats are not continuous. They include large areas of unsuitable habitat, such as mountain ranges and lakes.

[2/] Data used to project population densities were based on population estimates of 1-20 noncrucial and 20-50 crucial in Arizona and Utah, 1-49 noncrucial and 50-250 crucial in Nevada, with California in five separate population categories of 1-20, 20-50, 50-100, 100-250, and over 250, with 20 or more being crucial. The highest level of data on populations exists in California with the least in Arizona.

Habitat has been resurveyed, and data tend to indicate stable populations, as does data for the Chuckwalla Bench Crucial Habitat. One-time population data from study plots in Nevada tend to show population structures similar to those in California stable populations. One notable exception was a large die-off, prior to 1983, in the Piute Valley population. This die-off has been studied at length. The Arden Crucial Habitat is being urbanized, and the Sheep Mountain Crucial Habitat has low densities and apparently high mortality from Common Ravens.

Trend data from a long-lived animal such as the tortoise are difficult to assess, because of each population's longevity, difficulties with field work reliability and extrapolation to areas with no data, and variable responses to a variety of impacts and conflicts. Many specialists speculate that less than optimum conditions exist for many populations to remain stable or to improve.

C. BLM Planning and Management History by State

Prior to the 1970s, BLM management and concern over the desert tortoise was limited. As information on the tortoise was collected by state wildlife agencies, universities, private organizations, and the Bureau, attention to the tortoise in Bureau planning grew. More and more emphasis was placed on attempts to manage the public lands for multiple use and sustained yield of its resources (e.g., tortoises), to minimize environmental degradation of its habitat, and in some cases, to improve tortoise habitat. Bureau planning documents such as Management Framework Plans (MFP), and more recently Resource Management Plans (RMP), were developed. These plans reflect management goals and objectives on areas ranging in size from several hundred thousand acres to several million acres of public lands. Consequently, these management plans and related BLM actions vary from place to place with respect to tortoise habitat management. The Bureau has had no consistent guidelines specific to how desert tortoise habitat management should occur on public lands or how tortoise needs should be incorporated into such documents, environmental analyses, project plans, or mitigation stipulations. A brief state-by-state discussion follows documenting the current situation with respect to BLM management and the tortoise. It is beyond the scope of this document to define the extent to which these actions have been carried out and how successful they have been or will be toward desert tortoise protection or habitat improvement.

1. **Utah**

Desert tortoise habitat in Utah is managed by the Dixie Resource Area of the Cedar City District. The MFP concerning tortoise habitat in this area dates from 1977. One objective is to maintain and enhance habitat required by threatened or endangered species (this population is listed as threatened). The multiple-use decisions were 1) to establish the Woodbury Desert Study Area (WDSA), 3,040 acres in size; 2) to reduce livestock grazing on the Castle Cliffs Allotment by 60 AUMs; 3) to restrict vehicle use to designated roads and develop a management plan; 4) to withdraw the area from mineral entry under the 1872 mining law;

5) to close to oil and gas leasing for the WDSA, with no surface occupancy on the one-half-mile fringe around the WDSA; 6) to fence the area; and 7) to recommend predator control to protect tortoises. On areas outside the WDSA, the following management would occur: a) open areas to oil and gas leasing with four special stipulations to mitigate damage to tortoises and habitat; b) continue livestock grazing, implement a grazing system, but adjust season of use to protect tortoises until the system is implemented; c) restrict vehicle use to existing roads; d) recommend predator control; and e) acquire state and private lands. Subsequent to the MFP and Federal listing, a habitat management plan (HMP) was developed in 1980 to carry out actions prescribed by the MFP. The HMP actions include the following: 1) establish the WDSA; 2) establish a desert tortoise monitoring program; 3) develop a plan to relocate desert tortoises into the Beaver Dam Slope population; 4) establish a tortoise den inventory program to ensure dens are adequately maintained; 5) implement AMPs within the Beaver Dam Slope area; and 6) protect the desert tortoise from excessive predation by foxes and coyotes. An Allotment Management Plan (AMP) was devised for one allotment with the following objectives: 1) maintain forage to sustain a minimum of 1,312 AUMs for wildlife; and 2) increase vigor and composition of perennial grasses. Another AMP was developed with the following additional objective in addition to the two previously mentioned: ensure annual forage is available for use by the desert tortoise during March, April, and May in those years when annuals are produced. A 1,500-acre exclosure has been fenced, and livestock numbers have been adjusted. ORV designations are complete, and oil and gas leasing has been adjusted to meet MFP guidelines. In addition to BLM management, the USFWS is preparing a recovery plan for the Beaver Dam Slope population which includes a population monitoring program with two one-square-mile study plots. Range habitat monitoring is being accomplished through permanent photo plots with quadrat frequency transects to measure trend. Clipping studies for annuals are used to document production. All major actions on the Beaver Dam Slope have undergone a section 7 consultation and biological assessment since listing.

2. Nevada

Because the desert tortoise is distributed on creosote and blackbrush-dominated flats, valleys, and bajadas below 4,500 ft. in Nevada, many man-induced activities potentially may impact this species' habitat adversely. Wildlife benefits have been realized by incorporating special wildlife provisions in other program management plans, by developing stipulations and mitigation measures for wildlife, and, where necessary, by providing habitat rehabilitation following development. In the Clark and Caliente Management Framework Plans (MFP), protective mechanisms are in place to help prevent deterioration of desert tortoise habitat on the Las Vegas District, and special consideration is being given the desert tortoise to prevent its becoming threatened or endangered. The MFP decisions limit tortoise habitat degradation through a variety of means, with most methods

designed to address off-road vehicle use, grazing, and lands and minerals actions.

Coordinated Resource Management and Planning (CRMP) was used to recommend ORV designations for 3,097,131 acres in the Stateline-Virgin Valley Planning Area of the Las Vegas District. CRMP is a resource planning and problem-solving process based on the philosophy that resource conflicts can best be solved on a local level by direct communication among interest groups and individuals. The CRMP effort culminated in issuance of ORV designations for Clark County in September 1984. Depending on the area, ORV use is limited in 550,400 acres of crucial desert tortoise habitat either to designated roads; nonspeed competitive and noncompetitive use; noncompetitive use solely; or existing roads, trails, courses, and sand washes. Limitations are also imposed in these areas on season of use, type of use or number of laps, number of entrants, and location of pitting areas.

Off-road vehicle designations for the 3,416,393-acre Caliente Planning Area of the Las Vegas District were issued in December 1984. ORV use is limited to existing roads and trails within 51,360 acres of crucial desert tortoise habitat.

In 1982 inventories to identify and mitigate impacts of power line construction on desert tortoises led to development of mitigation measures for the species. Stipulations have been incorporated into right-of-way grants, mining plans, and mineral leases. For example, desert tortoise stipulations for the Intermountain Powerline Project transmission line were developed which provide for: 1) availability of an experienced tortoise biologist during new road construction and tower site clearing, as well as at pulling and tensioning sites; 2) locating, flagging, and avoiding tortoise burrows prior to initiation of surface-disturbing activities; 3) proper handling and moving of tortoises encountered; and 4) briefings for construction personnel on the status of and laws pertaining to the tortoise.

The northern limit of desert tortoise distribution in Nevada is in the Las Vegas District's Caliente Resource Area. The final Caliente Livestock Grazing Management Environmental Impact Statement, issued in 1979, concluded that grazing reductions and livestock removal during spring and summer (1 April - 16 September) would have positive effects on the desert tortoise population. Rangeland management guidelines for the Resource Area were issued in a program summary. Final Caliente Management Framework Plan (MFP) decisions were issued in February 1982. The Caliente Grazing CRMP Committee, charged with developing recommendations to implement MFP decisions, has completed action plans on all 80 of the eligible allotments.

Some Clark County MFP decisions issued in January 1984 are directly applicable to desert tortoise habitat protection.

> Grazing will be consistent with other multiple land-use objectives. In crucial desert tortoise habitat, adequate

amounts of spring ephemeral forage will be made available to desert tortoises. The perennial vegetation resource will be managed at a proper utilization rate to obtain a sustained yield and to improve livestock forage conditions. A specific monitoring plan, developed according to guidance contained in the Nevada Task Force's Monitoring Program, will be used to determine if those objectives are being met. If it is demonstrated through monitoring that livestock or wild horse and burro use in a given allotment is having an adverse effect on the resources identified in the multiple land-use objectives, particularly on crucial bighorn or desert tortoise habitat, then livestock and wild horse and burro grazing use will be modified to the extent necessary to meet those objectives.

Through coordination, consultation, and monitoring, habitat needs of wildlife species will be identified, particularly crucial habitat of desert tortoises and bighorn sheep, including adequate forage, water, and cover. These requirements will be met, so that in time population goals for those species will be attained as mutually agreed to between BLM and NDOW. These needs as well as multiple land-use objectives will be identified by allotment prior to authorizing livestock use on ephemeral range.

Grazing by domestic sheep will not be licensed in the McCullough Allotment. Only cattle grazing will be allowed. The McCullough Allotment contains 43,520 acres of crucial tortoise habitat.

In crucial desert tortoise habitat, domestic sheep use will be limited to a single pass through any use area in any one grazing season. Sheep use areas will be inspected annually to determine if perennial forage species are being unduly impacted. Use will be adjusted as necessary. Recommendations to address sheep-desert tortoise conflicts on the Bunkerville, Gold Butte, Billy Goat Peak, and Christmas Tree Allotments will be made during the CRMP process.

To provide recommendations to BLM on how to implement these decisions, a CRMP effort was undertaken. The Clark grazing CRMP effort began in early 1984. Grazing allotments with crucial desert tortoise habitat were identified for intensive management because of resource conflicts. These allotments require monitoring to ensure proper forage allocation and to measure success in achieving stated objectives. The CRMP Committee also recommended that BLM conduct ephemeral forage production studies for the desert tortoise. A program of detailed ephemeral production studies on crucial desert tortoise habitat was undertaken.

The Clark County MFP contains the following wildlife decision to benefit desert tortoise habitat: all users of the public land will be encouraged to travel existing roads or trails in crucial wildlife habitats. Where possible, new road or trail construction will be avoided in crucial wildlife habitat. Coordination

with mineral or geophysical companies that plan road construction within crucial habitat will be accomplished to mitigate adverse impacts that would occur as a result of such construction.

The Caliente MFP included the following management decision for the desert tortoise: protect the desert tortoise and other reptile habitats through protective stipulations in the environmental assessment process. Require maximum utilization of existing roads and trails by competitive ORV groups and other heavy-use groups and organizations. Undertake a continuous public awareness program to inform the public of habitat requirements for desert reptiles.

In summary, the desert tortoise and its habitat continue to receive high priority consideration and attention by the BLM in Nevada. Continued coordination with other agencies, interest groups, and public land users will occur to ensure this protection. A continued emphasis on monitoring and inventory efforts by BLM in Nevada can be expected. Land-use stipulations and mitigation measures will continue to be developed and implemented to minimize potential impacts from man-induced activities within crucial desert tortoise habitat.

The implementation and adherence to existing management decisions, plans, and agreements should help to meet the objective of maintaining habitat for a viable, self-sustaining population of desert tortoises within Nevada's Mojave Desert ecosystem. Actions being taken by the BLM and NDOW indicate a firm commitment to management consideration of desert tortoises within the framework of multiple-use planning and decisionmaking.

3. California

Little was known about the ecology of the desert tortoise in California prior to 1970, and little was being done to manage and protect the species. Early publications concerning the desert tortoise were often highly anecdotal and rarely had management content. More technical accounts--often resulting from observations of individuals held in captivity--were primarily concerned with reproduction, development, life history, and behavior.

The scope and emphasis of tortoise research in California and elsewhere changed dramatically after 1970. As public awareness of environmental issues increased during the following decade, research emphasis on tortoise ecology and human impacts on tortoise populations and their habitats also increased. By 1976, when the California Desert Conservation Area (CDCA) was established, a variety of studies in these subject areas were already under way or had been completed. By 1980, when the CDCA Plan was completed, the status, distribution, and density of tortoise populations throughout most of the California Desert had been estimated based on census data. Most of the tortoise research completed during the 1970's was supported in whole or

part by the Bureau of Land Management. A great deal of BLM-supported research has also continued into this decade.

Fifty percent of all desert tortoise habitat in California is on public land currently administered by BLM's California Desert District. This habitat is managed under guidelines established in the CDCA Plan. Management policy for the tortoise is based in part on tortoise density within specific areas, so that areas with significant tortoise densities in general receive the highest priority for management and protection. During pre-plan inventories, eight areas within the California Desert were found to support moderate to extremely high tortoise densities (20 to more than 250 individuals per square mile) and were designated as Desert Tortoise Crucial Habitat Areas for resource analysis purposes. A total of 24,650 (63 percent) of the 39,060 square miles comprising the CDCA were found to support tortoises.

During development of the CDCA Plan six areas within identified tortoise crucial habitats were designated under two classifications as management areas for long range management, and since 1980 two more planning areas have been designated.[1/] Three areas comprising a total of 122,000 acres, including private lands, where tortoise densities are particularly high and/or where habitats are of particularly high quality, were designated as Areas of Critical Environmental Concern (ACECs). Five additional areas comprising a total of 1,509,000 acres were designated as Desert Tortoise Crucial Habitat Management Areas. ACEC plans or habitat management plans (HMPs) have been developed or will be developed for each of these management areas.

The lack of completed planning documents for all HMP areas and ACECs does not imply that appropriate management actions are not already being implemented. First, the lag between completion of the CDCA Plan and completion of subsequent planning documents was recognized and addressed within the CDCA Plan itself. Management actions ranging from control of vehicle use to increased surveillance within desert tortoise habitat areas, and requiring implementation within three years of the CDCA Plan's completion (i.e., by 1983), were outlined in the CDCA Plan's wildlife element (additional short- and long-term management actions were to be described later during HMP and ACEC plan development). Second, in other elements of the CDCA Plan--e.g., the recreation, wild horse and burro, livestock grazing, recreation, and motorized vehicle access elements--additional guidelines relating to wildlife habitat protection were established.

During the development of the CDCA Plan from 1976 to 1980 a great deal of information was considered. Included in this process was one of the largest public involvement in planning efforts the Bureau had ever accomplished. As a result of this effort certain tradeoffs were made. These allowed guided use in

---

1/ The eight designated planning areas do not correspond to the eight crucial habitat areas described previously.

areas of known human expansion and concentration. Where environmental safeguards could better be ensured, tradeoffs consisted of land-use designations.

Finally, the multiple-use principle governs BLM policy throughout the California Desert District. All desert tortoise habitat areas are managed according to this policy, which provides land-use restrictions to benefit tortoises and/or tortoise habitat on 64 percent of the California Desert Conservation Area. The following represent the types of actions included in the CDCA Plan to reduce conflicts between tortoise and public use values:

- In general, vehicle use (including ORV use) in high-density tortoise habitats under management primarily for tortoise and vegetational values is limited to existing rights-of-way and to designated roads and trails.

- In habitats with high tortoise density, turnout of sheep on ephemeral range must be delayed until spring emergence of tortoises has occurred. Fenced exclosures to study the impacts of grazing have been constructed at the Desert Tortoise Natural Area (DTNA), in Ivanpah Valley, and in the West Mojave Crucial Habitat Area. A minimum of 350 pounds of ephemeral forage per acre must be available within designated "crucial" habitats (see CDCA Plan) prior to turnout of sheep.

- In the Chuckwalla Bench ACEC camping is restricted to areas lying within 100 yards of designated ORV and hiking trails.

- An interpretive center with trails and self-guiding brochures has been constructed in the DTNA to increase public awareness of the desert tortoise.

- Land acquisition within the DTNA has occurred through cooperative efforts between BLM, the Desert Tortoise Preserve Committee, and the Nature Conservancy.

- The California Desert District's 18-member ranger force patrols tortoise planning areas to the extent practicable, to prevent public users from abusing tortoises and their habitats.

- Mitigation of developments (e.g., pipelines, power lines, road construction, etc.) within Desert Tortoise Crucial Habitat Management Areas are required where development may impact the tortoises or their habitats. For example, mitigation measures required during construction of the Celeron/All American Pipeline included 1) limiting construction activities within tortoise crucial habitats to the months between October and March when tortoises are hibernating, 2) removal of active tortoises from construction rights-of-way ahead of construction equipment, 3) removal of hibernating tortoises from burrows which lie within pipeline rights-of-way, and 4) rehabilitation of any tortoises injured by construction activities.

In summary, the Bureau of Land Management has conducted or supported significant research of desert tortoise ecology in the California Desert and is committed to short- and long-range management and protection of tortoise populations and their habitats within significant portions of the species' California range. Eight areas with moderate to high tortoise densities have been designated for management of the tortoise. Management actions which have been implemented to date have been guided by general BLM policies concerning sensitive species, by the CDCA Plan, and by the planning documents (ACEC plans and HMPs) which have been completed for three of the eight designated planning areas. The completion of the remaining five documents and implementation of planned actions for long-range management of designated tortoise habitats may lag behind projected completion and implementation dates because of fiscal and manpower limitations. The Bureau in California is committed to managing and protecting the desert tortoise and to ensuring survival of viable tortoise populations using the principles of multiple-use management. Although specific management actions and objectives have not been written on five areas, overall CDCA guides provide limited protection for tortoise habitat until these plans are developed.

To facilitate plan development and overall tortoise habitat management on the public lands in California, in December 1986 the BLM's California Desert District established an interagency advisory group. The group is composed of representatives from BLM (5), California Department of Fish and Game (1), Desert Tortoise Preserve Committee (1), and Desert Tortoise Council (1). The goal of the group is to identify tortoise issues and propose specific solutions. Products developed by the group will then form the basis of a Desert Tortoise HMP, to be implemented within five years.

4. Arizona

Desert tortoise habitat is managed in all four of BLM's districts: Safford, Phoenix, Yuma, and the Arizona Strip. The relatively small amount of potential habitat in the Safford District's Gila Resource Area has yet to be inventoried. The Safford District's Winkelman MFP revision (1981) reflects management concern for the desert tortoise and gila monster. The Mescal/Dripping Springs MFP also incorporates this concern and requires recording all sightings and problems affecting tortoises. The Winkelman MFP Amendment (1985) and the San Pedro Planning Analysis (1985) emphasize the value of blocking up lands specifically for desert tortoise habitat, especially in the Muleshoe Ranch and Aravaipa Canyon areas. The Final Eastern Arizona Grazing EIS requires that EAs be done prior to any range improvement.

In the Yuma District a recent inventory of 53 sites revealed that 30 percent had tortoise sign. The Yuma District RMP identifies 247,740 acres as priority wildlife habitat. Based on environmental analysis, BLM would mitigate for wildlife on

proposed projects or actions on public lands. Special Management Area designation and off-road designations for some areas would have side benefits for the desert tortoise, though the extent of this is unknown.

In the Phoenix District public lands are managed under a large number of plans, the Cerbat-Black MFP, the Hualapai-Aquarius MFP, the Lower Gila North MFP, and the Lower Gila South RMP. An RMP is being prepared for the Phoenix Resource Area, the remainder of the Phoenix District. Under these and earlier planning documents, HMPs and some AMPs have been prepared. Some of these plans incorporate or recommend management actions for the desert tortoise. The Cerbat-Black MFP has no specific management identified for the desert tortoise. There is virtually no inventory data for the region.

The Hualapai-Aquarius MFP has several decisions affecting the desert tortoise. Two HMPs have been prepared for this area. BLM will mitigate for tortoises prior to construction of any projects through the environmental analysis process. To the extent possible, BLM will not authorize construction of range developments that would result in heavy livestock concentrations within crucial tortoise habitat. When AMPs are developed, BLM will consider ways to increase desert tortoise forage production and to reduce tortoise-livestock competition for ephemeral forage in crucial habitat areas. BLM will monitor tortoise habitat for population and vegetation change.

The Hualapai HMP would provide seasonal forage for the desert tortoise through: 1) maximizing herbaceous forage availability and production through AMPs; 2) limiting use of perennial forage by livestock to an average 50 percent; 3) delaying authorization of ephemeral or supplemental livestock use until 300 pounds/acre dry weight of forage is produced in crucial habitat; 4) on perennial range, authorizing supplemental licensing only after 300 pounds/acre dry weight of forage is produced in crucial habitat; 5) placing new water, salt, or mineral supplements more than 2 miles outside crucial habitats; and 6) discouraging change in class of livestock from cattle to sheep. All these activities would be initiated after crucial habitats were better defined on the ground. In the Hualapai-Aquarius MFP area, 44,400 acres of crucial habitat have been recommended as suitable through preliminary final EISs for protection under wilderness designation.

In the Lower Gila North Planning Area, BLM recommended 15,000 acres of crucial desert tortoise habitat as suitable for wilderness protection through a preliminary final EIS. In addition, the MFP decisions state: 1) BLM will provide site evaluation and mitigate for the desert tortoise before construction of various "facilities;" 2) herbaceous forage and its use by desert tortoises in conflict areas will be increased by building pastures around tortoise populations and resting those pastures from livestock use between February and July, attaining good or better range condition in heavily populated tortoise areas, and excluding domestic sheep from crucial areas in one allotment

from February 1 through June 30. A possible mitigating measure in the Lower Gila North grazing EIS was to locate range developments (i.e., waters) greater than 3 miles from desert tortoise crucial habitat. All of the above, except No. 2, have been implemented. Virtually all lands are available for exchange under the MFP, although exchange proposals would be analyzed through the NEPA process, including analysis of impacts to the desert tortoise.

The Lower Gila South RMP states that new livestock waters within two miles of crucial habitat will be relocated based on impact analysis. It also states BLM will develop mitigation for tortoises prior to construction of facilities. The draft proposes wilderness designation, 10,500 acres of which is crucial tortoise habitat and is subsequently protected. Most tortoise habitat would be retained in Federal ownership under the plan. No special management areas are proposed. The Lower Gila South HMP is being prepared at this time. Both this draft HMP and the draft Hualapai HMP are being developed to have consistent, practical, and positive tortoise management actions.

The draft Phoenix RMP retains the Picacho Mountains area in Federal ownership and recommends that the area be managed to protect and study desert tortoise populations. There are very few tortoise data for the area. Land tenure adjustment is the major issue. Old planning documents for this area and three HMPs identify no management for tortoise habitat. The Eastern Arizona Grazing EIS for this area identified the following mitigating measures which should be implemented. BLM would not authorize construction of rangeland developments that would result in heavy livestock concentrations within crucial desert tortoise habitat. Grazing practices would consider ways to increase desert tortoise forage production and to reduce tortoise-livestock competition for ephemeral in crucial habitat areas.

In the Arizona Strip District tortoise habitat is managed by the Shivwits Resource Area. The MFP for this area contains the following decisions: 1) designate allotments below 3,600 ft. (tortoise habitat) as ephemeral-perennial range and grazed less than 50 percent utilization on key shrubs and perennial grasses; 2) initiate studies to determine habitat requirements and limiting factors; 3) develop and implement an HMP; 4) retain a 500-acre tortoise exclosure; and 5) protect tortoise habitat from destructive actions.

The Virgin River-Pakoon Basin HMP covers the district's desert tortoise populations. Actions related to the tortoise are as follows: 1) livestock waters are being discouraged in high density tortoise areas. Mineral blocks and waters are not allowed within 2 miles of high sign frequency areas; 2) changes in class of livestock from cattle to sheep are not being considered; 3) rangeland monitoring is being conducted to ensure that proper utilization and improved livestock distribution are achieved and maintained; 4) the 500-acre tortoise exclosure has

been retained for its original purpose; 5) a wildlife temporary was hired to gather existing tortoise data and to identify any data gaps; 6) ORV use is not allowed in tortoise habitat; 7) acquisition of state and private lands is being considered to acquire additional crucial habitat and maximize Federal ownership and management; 8) land-use proposals are carefully evaluated as to their potential impact on tortoise habitat; and 9) the AGFD is being encouraged to change their reptile regulations to prohibit the collection of tortoises.

With respect to grazing management, AMPs have been developed to ensure forage utilization levels do not exceed 50 percent of the current year's growth on key forage perennials. Rest is being provided in portions of grazing allotments during one out of every three years. Use of some pastures is being deferred until after the critical spring growing season. Rangeland improvements are permitted or denied only after thorough evaluation of the anticipated impacts to desert tortoise habitat. Wilderness designation has protected 18,700 acres of low-density tortoise habitat from surface-disturbing activities on the Arizona Strip.

Arizona BLM is a contributing member of the Arizona Interagency Desert Tortoise Team, which is currently preparing a statewide research and management plan for the species.

C. Impacts and Management Actions

The desert tortoise is a long-lived wildland herbivore with a low reproductive potential that likely requires relatively large areas to maintain viable populations.[1/] The species is slow to recover and is vulnerable to a variety of natural processes and man-caused disturbances. As more is learned about the desert tortoise and their habitat requirements, BLM has taken action to mitigate the adverse impacts. The following is a discussion of known impacts and examples of management actions implemented mostly during the past ten years.

1. Off-Road Vehicles

Impacts: With the recent boom in human population across the Southwest Sun Belt, there has been an increase in use of deserts as recreational playgrounds. Off-road vehicle (ORV) use of many types can impact the tortoise and its habitat. Mild desert weekends often support hundreds of 4-wheel, motorcycle, and all terrain vehicle users in remote areas inhabited by the desert tortoise. Off-road use has been shown to compact soils, crush dens and pallets, crush tortoises, and reduce productivity, cover, and diversity of vegetation (Bury et al. 1977; Busack and Bury 1974). One recent study showed reductions in numbers and biomass of tortoises in moderately to heavily used off-road

---

1/ "Viable populations" are those with sufficient numbers and distribution of reproductive individuals to insure that their continued existence is well distributed in the planning area. (36 CFR 219.19.)

desert areas (Bury 1978). These effects vary greatly with the intensity of vehicle use. Even on existing dirt and paved roads tortoises may be crushed, and populations may diminish near roads (Nicholson 1978).

Management Actions: Actions taken in some areas where off-road vehicle impacts have been determined include:

- road closures;
- limiting use to roads, trails, and washes;
- limiting use by season; and
- controlling and disallowing competitive vehicle events in crucial tortoise habitat areas.

2. Livestock and Burros

Impacts: Livestock and burros have been grazing desert tortoise habitat for the past 100 to 150 years. Livestock grazing on the public lands was unregulated until 1934 when the Taylor Grazing Act was passed. This unregulated use resulted in heavy grazing which had an adverse impact on native vegetation where perennial plants were replaced with annuals or eliminated. The desert tortoise presently exists in different vegetation types as a result of past grazing. During the past 50 years, improved range condition has been one of BLM's primary goals. Fences, water developments, and trails were developed to improve or enhance range conditions through control of livestock. These management actions have greatly improved vegetation conditions, but have resulted in some adverse impacts through concentration of livestock in pastures where trampling could destroy tortoise dens and through forage use during periods when the tortoises were also feeding. There is greater competition for forage between sheep and tortoises during the active feeding periods of the tortoise.

Management Actions: The following actions have been taken in some areas to eliminate or reduce the impacts of livestock grazing on desert tortoise habitat:

- Limiting, precluding, or deferring livestock grazing in crucial tortoise habitat through implementation of livestock management plans;

- Locating grazing improvements outside crucial habitat or in areas where livestock concentrations will not affect normal tortoise activities;

- Constructing improvement projects to ensure that the natural habitat is not disturbed or that necessary disturbances are minimal and temporary in nature; and

- Preparing and implementing burro herd management plans to control numbers and areas to be grazed.

3. Land Use Authorizations/Tenure

Impacts: Economic and population growth within and adjacent to tortoise habitat has required growth in the transportation of people, goods, power, water, and fuel across the desert region. Public lands within the range of the desert tortoise support this growth on a large scale. Impacts caused by these features often do not have immediate direct effects on tortoise populations. Rather, the impacts are long term and cumulative. Public lands are generally in demand for expansion, military use, and other human activities. Once out of Federal jurisdiction, the tortoise usually is not a major consideration in the use of those lands.

Management Actions: The numerous requests for land-use authorizations or exchanges for private and state lands in and around tortoise habitat have caused BLM to take the following actions in some areas to ensure that the habitats are being protected.

- Not authorizing activities where other alternatives exist as identified in long-range land-use plans (trade offs);

- Stipulating habitat protection measures where construction activities are necessary through preconstruction planning and on-site inspection;

- Planning land exchanges to enhance tortoise habitat through blocking up important habitat areas for protection or improvement; and

- Entering into cooperative management agreements to benefit the species where multiple land ownership occurs.

4. Collection, Shooting, and Vandalism[1/]

Impacts: Tortoises are a great attraction to desert recreationists. This vulnerability to easy pursuit can lead to collection, illegal removal, or vandalism.

Collection has taken a large toll on some tortoise populations (Berry 1984a). For example, thousands of tortoises were collected and sold to tourists prior to the 1970s. Removal of even a few tortoises from a small population could be enough to skew population structures significantly and render them unviable. The importance of the effect of collection has become so well recognized that all states except Arizona have banned collection of tortoises from the wild.

Management Actions: Informing and educating the public on the adverse impacts to the populations and patrolling areas of heavy public use.

1/ Management responsibility for the species remains with state wildlife agencies; BLM responsibility is for habitat.

5. Predators

Impacts: In most desert tortoise populations, predation may not be an important limiting factor, though smaller or depleted populations could be more vulnerable. Young tortoises are more susceptible to predation than larger tortoises. Common Ravens, coyotes, Golden Eagles, Roadrunners, kit foxes, and badgers prey upon tortoises. Berry (1984b) studied avian predation in California and found that in some areas, Golden Eagles and Common Ravens take many juvenile tortoises. Ravens may be a particular problem in areas with relatively little ground cover and many natural or man-made perch sites for birds (e.g., fence posts and power poles). High predation rates at the Desert Tortoise Natural Area may be explainable in this way.

Management Actions:

- Cooperating with state and Federal wildlife agencies in authorizing predator control on public land and developing methods to reduce or eliminate predation where determined to be a threat to a population; and

- Modifying structures to prevent predator perching.

6. Mineral Exploration and Development

Impacts: Mineral resources on Federal lands are explored for and developed under provision of leasable, salable, and locatable mineral laws. These minerals occur throughout the regions identified as desert tortoise habitats, but certain mineralized areas receive more concentrated exploration and development impacts than others.

Generally, minerals are available for exploration and development within desert tortoise habitat with minimal conflict between these activities and preservation of important habitat areas. Mineral leases and sales are approved with the appropriate surface management restrictions identified through analysis of impacts based on a project proposal. Locatable minerals are regulated under 43 CFR 3809. These regulations provide for mineral entry, exploration, location, operation, and purchase pursuant to the mining laws. These activities must be conducted in a manner that will prevent unnecessary or undue degradation and provide protection of nonmineral resources of the Federal lands.

Mineral exploration involves activities similar to those discussed under off-road vehicle use and proliferation of roads. Mineral development activities are more localized and may involve more intensive surface use and disturbance. These activities tend to be longer term and have cumulative impacts. Significant mineral developments have both direct and indirect impacts on desert tortoise habitat.

Management Actions: The following actions have been taken in some areas to reduce or eliminate the direct impacts of mineral activities in crucial habitats:

- Withdrawing crucial habitats from mineral entry (DTNA);

- Stipulating no surface disturbance on mineral leases;

- Providing mitigation through stipulations to avoid development activities in mining plans of operation;

- Not allowing oil and gas leasing in habitat areas where development would be destructive to important habitats; and

- Educating mining companies and independent miners about impacts that are adverse to tortoises and their habitat and encouraging their support and cooperation in protecting the species' habitat. For example, Goldfields, a new operator of a gold mine near El Centro, has instituted mandatory desert tortoise training for all their employees.

7. Wildfire

Impacts: Fires, though a natural part of desert ecosystems, are now more often started by man, frequently during seasons when tortoises are active and exposed. The frequency and intensity of wildfires in tortoise habitat vary greatly, and may sometimes cause tortoise deaths, remove forage and cover needed by tortoises, or cause long-term habitat destruction through fire-fighting activities.

Management Actions: The following management actions are taken in some areas to reduce or eliminate the potential impacts:

- Restricting presuppression activities to those periods when the tortoises are inactive during the spring and fall;

- Restricting suppression activities where surface disturbance would be greater than the temporary disturbance of the fire itself; and

- High priority for taking immediate action to suppress wildfire in tortoise habitat to limit any potential change in vegetation type that may adversely affect the habitat.

8. State Summary of Impacts

In Utah on the Beaver Dam Slope livestock grazing and predation by coyotes, foxes, and Common Ravens cause the most impact. These impacts were identified both in the Federal Register listing notice and in the Bureau Management Framework Plan (MFP) for the area. The effects of livestock grazing on tortoises are presently being mitigated by approved Allotment Management Plans (AMP). Predation of tortoises on the Slope continues to be a problem of unknown magnitude.

Tortoise habitat around the communities of St. George, Washington, and Hurricane, Utah, is heavily used by man. These communities, especially St. George, are among the fastest growing in the West. Present and future impacts to tortoises from urbanization, ORV use, and land ownership problems are expected to be significant if unmitigated.

The most significant conflicts perceived to exist with desert tortoises in Nevada are livestock grazing and ORV use. This is due to the degree and extent that both activities occur throughout the tortoise range and the potential for impacts to vegetation. Livestock use occurs to varying degrees on most tortoise crucial habitat areas. Special management has been applied to livestock grazing in crucial tortoise habitat areas, but there is still considerable potential for competition for succulent forage during critical periods. This may result in additional stress to tortoises which ultimately could have significant long-term impacts on the health and vigor of tortoise populations. Though ORV competitive events are much more restrictive in the amount of habitat affected, localized populations of tortoises may be significantly impacted through direct impacts of the events themselves (e.g., collapsed burrows) or indirectly through a long-term degradation of the vegetative forage resource.

Five types of impacts pose threats to desert tortoise populations, which include livestock grazing, proliferation of roads and other rights-of-way, collecting and vandalism, predators, and off-road vehicles. The roads and rights-of-way tend to create a higher impact due to fragmentation of habitat.

Threats to desert tortoises in Arizona are medium to high for all impact types except agriculture, disease, and wildfire. The highest perceived conflicts involve the proliferation of roads, rights-of-way, etc., which promote further fragmentation of tortoise habitat.

E. Research, Inventory, and Monitoring

A great deal of scientific research, inventory, and monitoring has been accomplished with respect to the desert tortoise. The first significant tortoise work was accomplished by Woodbury and Hardy in the 1930s and 1940s in Utah. Their studies, and later followup studies, were the basis for listing the Utah population in 1980. The 1970s saw a great surge of tortoise work, much of it accomplished by or for BLM.

Considerable inventory has been performed on public lands using strip transects to determine distribution. Relative abundance of tortoises at each site has been determined using sign frequency.

Monitoring study plots have been established to determine long-term population attributes of tortoises in different areas (e.g., tortoise densities, age structures, sex ratios, and mortality rates). Monitoring study plots are also used to calibrate inventory transect data and to detect changes in tortoise populations and habitats over

time. These studies have been used for establishing baseline management information needed in land-use planning, environmental impact statements, and other assessments.

Many special studies and research projects have been accomplished with funding from BLM, utilities, universities, and other sources. Most research has been focused on determining population characteristics, forage items, home range size, grazing effects, and habitat characteristics. Berry (1984) and Hohman et al. (1980) reviewed and annotated literature on the tortoise regionwide, representing the research and studies known at the time. Sheryl Barrett reviewed the literature for Arizona (Arizona Game and Fish Department in prep).

1. Inventory Techniques

Strip transects (Berry 1984a, Chapter 2) have consistently been used for desert tortoise inventory. Burge (1980) modified the technique slightly for Arizona south of the Grand Canyon. Numbers of strip transects and study plots are found in Table 3. Methods have changed only slightly since the early 1970s. Transects have been run from as short as 1 mile to as long as 3 miles, and are typically 10 yards wide. Different types of sign recorded along each transect include: burrows, pallets, scat, eggshells, tracks, skeletal remains, and live tortoises. Sign is totaled for each category and a figure for total adjusted sign, or total corrected sign is used to determine relative abundance of tortoises. Total adjusted or corrected sign is determined based on groupings of sign and relative importance of different types of sign in nature (Berry 1984a). Using sign to determine relative abundance of tortoises is a standard (though imperfect) procedure that suffices in the applications for which it is used. The only viable alternative would be the use of more study plots and more intense study which are time-consuming and thus prohibitively expensive. Success of this technique is directly attributable to the expertise of field personnel with tortoises.

2. Monitoring Study Plot Techniques

Use of study plots is a standardized method for determining certain population characteristics for tortoises at a particular site. Plots are typically one square mile in size, with adjustments made to enlarge them by one-half to one square mile if fewer than 50 tortoises are found initially. Plots were initially searched for 30 days in the 1970s, but more recently plots have been searched for 60 days, due to realization that 30-day searches could not accurately provide density estimates.. This technique is invaluable in determining population characteristics for tortoises in a particular area, such as density, age-size class structure, sex ratios, mortality rates, and other parameters. Such searches result in information no other technique can give, and the process is quite well standardized. This method requires that field workers have a good deal of tortoise field expertise; otherwise the data may not be reliable.

Table 3. Extent of inventory and study plots by state.

	State			
	Utah	Nevada	California	Arizona
No. of Transects	15	870+	2,000+	808
Mi. of Transects	30	1,305	3,000+	1,631
Areas/Ac. in Need of Inventory	5,760	Pahranagat Vly. Mormon Mesa El Dorado Vly. Gold Butte Tule Desert	Chuckwalla ACEC	1,680,000[1/]
No. of Study Plots	5	6	28[2/]	6[3/]
Estimated No. of Additional Study Plots Needed	0	9	0	22

[1/] +230 3-mile transects needed to better define crucial habitats.

[2/] 16 plots are being used for monitoring on a 4-year cycle. Funding has been insufficient to maintain cycle.

[3/] 4 additional were begun, but abandoned due to low population levels.

3. Analyses of Inventory and Study Plots

Analysis of transect data is fairly standardized since total sign and total adjusted sign are the indices used for describing surveyed areas. These sign are compared to sign found on transects at study plots where densities are known. Densities are then extrapolated to the entire surveyed areas (Berry 1984a, Chapter 2). It is recognized that extrapolating densities from data derived from small sample sizes, and the various abilities of field personnel to find sign in a variety of habitats introduces error. However, this methodology is usable, repeatable, and practical with respect to the funds and time required to map tortoise habitat densities. Analysis of study plot data is fairly straightforward, and is described in Berry (1984a, Appendices 3, 6, 7). Care must be taken to repeat the same field methodologies on study plots for later determinations of trend. Also, data have been interpreted differently in some cases. As with all biological data, if a controversy exists, several arguments can be made as to which interpretation is correct.

There is controversy surrounding the accuracy of extrapolating data from 3,700 transects and 45 study plots to an area which approximates 75,880 square miles. The actual area of transect (3 miles by 10 yards = 63 sq. miles) plus all study plots of 1 square mile each (45 sq. miles) totals 108 square miles. This small sample probably does not adequately represent an area in excess of 75,000 square miles. Another factor affecting these data is that the sampling plots are often located at or near direct impact sites.

4. Other Studies or Research

A great deal of research has been performed on the tortoise. Some of the more applicable work is described here. Studies have been performed on the feasibility of relocating tortoises away from a highway and the feasibility of using barriers and culverts in tortoise habitat to protect populations adjacent to roadways (Fusari 1980). A study has been conducted on the effects of paved roads on a tortoise population (Nicholson 1978). Several studies have attempted to document effects of livestock grazing on the tortoise (Medica et al. 1982; Nicholson and Humphreys 1980; Turner et al. 1981; Hohman and Ohmart 1978, 1980). Studies of several important population attributes have been conducted with funds from the Bureau of Reclamation, Department of Defense, Department of Energy, and Southern California Edison. Studies on mitochondrial DNA and blood proteins are being conducted to determine genetic differences between tortoise populations. So far, this research has indicated that tortoises west and north of the Colorado River are genetically different from tortoises east and south of the Colorado River (Jennings 1986, Lamb and Turner in prep.). The Mojave Desert Range Project is a group of Cooperative Extension Service Advisors. A subcommittee of this project has been created to foster research toward nutritional needs of tortoises and the effects of livestock grazing on these needs and the tortoise's

physical habitat. Weinstein et al. (1986) and Schamberger and Turner (1986) modeled habitat relationships of the desert tortoise in California using habitat characteristics to define habitat quality in terms of tortoise abundance. This model has not been field tested to date, but such testing is expected to begin in 1987.

With respect to the amount of data available for management purposes, California ranks first, followed by Utah, Nevada, and Arizona.

III. EXISTING LAWS AND GUIDANCE

A. Federal Laws and Guidance

The desert tortoise presents a unique situation in that its range covers portions of four states, and that the species is federally listed as threatened in Utah. The following is a list of principal laws, regulations, and policies which are presently being used to manage desert tortoise habitat. A short description of the relationship of each Federal law, policy, regulation, and manual guidance can be found in Appendix 1.

1. Federal Laws

a. Mineral Leasing Act of 1920, as amended; 41 Stat. 437.
b. Taylor Grazing Act of 1934, as amended; 43 U.S.C. 315, 48 Stat. 1269 (1970).
c. Material Sales Act of 1947, as amended; 61 Stat. 681.
d. Public Law 167, Multiple Surface Use Act, Act of July 23, 1955; 60 Stat. 367.
e. Fish and Wildlife Coordination Act, as amended; 16 U.S.C. 661-667e, (1958) 82 Stat. 563.
f. Sikes Act of 1960; 16 U.S.C. 670a-f, 74 Stat. 1052. Amended by P.L. 93-452; 88 Stat. 1369 (1974); and by P.L. 95-420; 92 Stat. 921 (1978).
g. National Environmental Policy Act of 1969; 42 U.S.C. 4321-47, 83 Stat. 852.
h. Mining and Mineral Policy of 1970, P.L. 91-631; 84 Stat. 1876.
i. Endangered Species Act of 1973; 16 U.S.C. 1531 et seq., 87 Stat. 884. Amended by P.L. 94-359, 90 Stat. 913 (1974); and by P.L. 95-212, 91 Stat. 1493 (1977); and by P.L. 95-632, 92 Stat. 3751 (1978); and by P.L. 96-159 (1979); and by P.L. 97-304 (1982).
j. Federal Land Policy and Management Act of 1976; 43 U.S.C. 1701 et seq., 90 Stat. 2743.
k. Public Rangelands Improvement Act of 1978; 43 U.S.C. 1901 et seq.

2. Executive Orders

a. Executive Order 11514 of 1970 (Protection and Enhancement of Environmental Quality.

b. Executive Order 11644 of 1972 (Use of Off-Road Vehicles on Public Lands).
c. Executive Order 11989 of 1977 (Off-Road Vehicles (ORV)).

3. BLM Manual

a. BLM Manual Section 6840.06 and 6840.3.

4. Code of Federal Regulations (43 CFR)

a. 43 CFR 3800 Exploration and Mining, Wilderness Review Program.
b. 43 CFR 8340 Off-Road Vehicles.
c. 43 CFR 8364 Closures.

8. State Laws and Guidance

Much attention has been given to desert tortoise throughout the four-state region of California, Nevada, Utah, and Arizona. Brief descriptions follow that identify the legal status of the desert tortoise by state.

1. California

Grant (1946) indicates that in 1939 sale or purchase of the desert tortoise was forbidden. The desert tortoise is the state's official reptile and continues to be protected.

The California Species Preservation Act of 1970 (Fish and Game Code Sections 900-903 and 2050-2055) establishes the intent of the California State Legislature to preserve, protect, and enhance the birds, mammals, fish, amphibians, and reptiles of California. It gives the California Department of Fish and Game (CDFG) responsibility for establishing criteria for determining if a species or subspecies is rare or endangered in the state. The California Fish and Game Commission is given the authority to list species or subspecies as rare or endangered under this act in California. The act prohibits the importation, take, possession, and sale of state-listed species, but there is no direct mandate to preserve, protect, or enhance the habitats of such species and subspecies. Habitat management for state-listed rare and endangered species is mandated somewhat indirectly through Federal laws and policies.

The California Fish and Game Code, Sections 5000-5002 states that:

5000. It is unlawful to sell, purchase, harm, take, possess, or transport any tortoise (Gopherus) or parts thereof, or to shoot any projectile at a tortoise (Gopherus). This section does not apply to the taking of any tortoise when authorized by the Department. (Amended by Stats. 1977, Ch. 1208.)

5001. The provisions of Section 5000 do not prohibit the possession of any tortoise (Gopherus) when the owner can demonstrate that such tortoise was legally acquired and possessed

before the effective date of this section. The owner of a tortoise which may be possessed under this section shall mark or otherwise identify such tortoise to the satisfaction of the Department, and shall not transfer such tortoise to any other person without prior approval of the Department. (Added by Stats. 1972, Ch. 301.)

5002. The Department may issue permits, subject to such terms and conditions as the Commission may prescribe, authorizing the possession of any tortoise (Gopherus) or any part or product thereof by. an educational or scientific institution or a public zoological garden. (Added by Stats. 1972, Ch. 301.)

674. Permits to Possess Desert Tortoises (Gopherus).

(a) Desert tortoises may be possessed only under the authority of a permit issued by the Department. The Department may issue a permit for the possession of a desert tortoise provided the tortoise was legally acquired and possessed prior to March 7, 1973. The Department may require an applicant for a permit to submit proof of the legal acquisition of any desert tortoise.

(b) Applications for a tortoise permit shall be submitted on forms furnished by the Department and may be filed with the Department at any time. Upon approval of the application, the Department shall provide a tag which shall be affixed to the desert tortoise as directed by the Department.

(c) No desert tortoise may be transferred to any other person without prior Department approval.

(d) Possession of a desert tortoise, regardless of subspecies except under the authority of a Department permit is in violation of this section. Untagged desert tortoises shall be seized by the Department.

Bury and Marlow (1973), cited in Hohman et al. (1980), state that: Offenses are punishable by a $1,000 fine and/or one year in jail.

California's permit system, started in 1973, has been successful. The program, allowing for scientific study and educational display and for those tortoises in captivity, has also increased public awareness of the species and threats to it and its habitat.

The BLM/CDFG Master Memorandum of Understanding (CA-192 signed July 28, 1982) contains many general statements which apply to candidate and endangered species and their habitats.

The BLM considers the desert tortoise as a "sensitive species" in California because its range is fairly restricted and any appreciable reduction in populations or extant habitat or any deterioration of habitat condition could necessitate listing.

The BLM's CDCA Plan lists the desert tortoise a sensitive species and plans for the establishment of several ACECs to benefit tortoises. The plan also establishes criteria for minimizing the effects of certain land uses on tortoise habitat (e.g., grazing, ORV use). BLM policy is to manage the habitat of sensitive species to minimize the need for official listing as threatened or endangered. Sensitive species are to be considered in all land-use decisions.

2. Nevada

By authority of Nevada Revised Statutes 501.110 (1977), the Nevada Board of Wildlife Commissioners passed Nevada Administrative Code 503.080 on November 10, 1983, which identified the desert tortoise as a protected and rare reptile (with the exception of domestic animals within the urban areas of Clark County).

Under these regulations, a rare species is defined as a species which, although not presently threatened with extinction, is in such small numbers throughout its range that it may be endangered if its environment worsens.

Catching or killing desert tortoise or any other terrestrial turtle is unlawful. Violations are punishable by a minimum $100 fine. The statute is enforced by the Nevada Department of Wildlife. Nevada has no legal allowance for tortoises already in captivity before the Nevada law was passed. The BLM and Nevada Department of Wildlife recognize the desert tortoise as a "sensitive species" in Nevada.

In April 1980 the Nevada Department of Wildlife initiated a program for captive tortoises turned in to the Department, whereby they would be released on various Las Vegas golf courses. By March 1981, 80 tortoises were released on two golf courses. No additional tortoises have been released since 1981. The passage of NAC 503.080, which provides for legal possession of captive tortoises, allows people who no longer want their tortoises to now legally give them to another party.

3. Utah

Wildlife Resources Code of Utah--Section 23-13-2, subsection 28--defines the desert tortoise as protected wildlife. Section 23-13-3 states that "it shall be unlawful for any person to take any protected wildlife or for any person to permit his dog to take protected wildlife except as provided by this code or the rules and regulations of the wildlife board or board of big game control." Section 23-13-5, states that "it is unlawful for any person to import into or export from the State of Utah any species of live native or exotic wildlife . . . ." Section 23-20-6, states that "it is unlawful to purchase, sell, offer for sale, barter or to obtain for sale, purchase or barter, any protected wildlife . . . ."

Utah also has an amphibian and reptile proclamation which lists 14 reptile species, including the desert tortoise as a complete protection species which "may not be taken, killed, captured, possessed, purchased or sold at any time without written authorization by the Utah D.W.R. . . ." Under this proclamation dens or hibernacula are protected from disturbance without a permit.

With regard to the desert tortoise, no specimens may be taken, killed, captured, or possessed except for research purposes as authorized by permit from the Division of Wildlife Resources. To fulfill requirements of the permit, a report must be submitted at the end of the year or within 15 days of the expiration date detailing dates of collection, localities, species name, and disposition of collection. Administration of permits is carried out by the Division of Wildlife Resources. Currently, certificates of registration are being issued to individuals to possess pairs of tame or disabled desert tortoises. Any offspring from these tortoises are property of the state and will be surrendered to the state for release at the appropriate release sites off the Beaver Dam Slope. The maximum fine for violation of Utah laws on "protected" species is $299, and the offense is considered a misdemeanor.

The tortoise population in the Beaver Dam Slope area of Utah was listed as threatened in 1980.

4. Arizona

The State of Arizona has charged the Arizona Game and Fish Commission and Department with managing the vertebrate wildlife in Arizona (Arizona Revised Statutes, Title 17). To focus habitat management activity in Arizona, the Department has, since 1975 and subject to Commission approval, maintained a list of threatened or otherwise special-interest species of wildlife.

The most recent Game and Fish Threatened Native Wildlife of Arizona list was published in December 1982. Species presently are listed in one of four groups:

Group 1. Species or subspecies known or suspected to have been extirpated from Arizona but which still exist elsewhere.

Group 2. Species or subspecies whose continued presence in Arizona is now in jeopardy because of substantial population declines. Extirpation from the state is highly probable without recovery efforts.

Group 3. Species or subspecies whose continued presence in Arizona could be in jeopardy in the foreseeable future. Serious threats to the occupied habitats have been identified and populations 1) have declined or 2) are limited to few individuals in a few locations.

Group 4. Species or subspecies for which there is a moderate threat to the occupied habitats but for which substantial population declines or habitat loss have not occurred.

Currently, the desert tortoise is listed in Group 3. It is expected that the state and Federal agencies in Arizona will continue focusing management attention on the desert tortoise.

Game and Fish policies address collection of individual animals. Arizona reptile regulations permit that one desert tortoise may be taken alive and possessed. None may be killed or exported from Arizona (Commission Order 43). A tortoise may not be taken unless the person at the time of taking has a valid hunting license on his/her person and exhibits it upon request for inspection to any game ranger, wildlife manager, or peace office (Arizona Revised Statutes, Section 17-331). The progeny of lawfully held tortoises may, for 12 months from date of birth, be held in captivity in excess of the stated limit. Before or upon reaching 12 months of age, such progeny may be disposed of by gift to another person or as directed by the Arizona Game and Fish Department (Commission Order 43). Desert tortoises or their progeny may not be purchased, bartered, sold, leased, or offered for sale (R12-4-319).

IV. FINDINGS AND RECOMMENDATIONS

During the review and analysis of the desert tortoise on a rangewide basis, the Task Force found the following areas of concern:

- Inconsistent applications, emphases, and designations of crucial and noncrucial habitats. Firm criteria for these designations were lacking. It was also noted that crucial and noncrucial terminology applied to all sensitive species and in some places was commonplace. It did not lend emphasis to habitats of species which were in need of immediate attention. Therefore, to gain this emphasis, the Task Force recommends the "category" terminology for desert tortoise habitat (see C below).

- General BLM coordination with state wildlife agencies and conservation organizations is occurring. This coordination normally is site specific by District and Resource Area. Bureau personnel are to be commended for this effort. However, while on a case-by-case (or state-by-state) basis knowledge and operational management for the tortoise may be occurring, administratively, the land and species managers have not coordinated actions which should protect and enhance desert tortoise management on a rangewide basis. Therefore, the Task Force recommends a solution through participation of line habitat and species managers from throughout tortoise range on an Oversight Committee (see Recommendation A).

- Tortoise inventories and monitoring techniques currently exist, but they need to be standardized on a rangewide basis. Although technology will continue to be improved and refined, current

methods exist to accomplish public land management within the state of the art. Therefore, the Task Force has recommended no change in current techniques (see Recommendation B). This should not be construed to mean that future improvements should not be adopted on a rangewide basis.

- There exists today several articles which analyze and interpret the data which have been collected through study plots and inventories. The data collection methods were sound, but controversy currently exists between professionals and agencies relative to the correct interpretation of these data. Also some questions arose about how broadly could site-specific data be extrapolated and remain valid. As a result, the Task Force concluded that work remained to be done on this aspect before proper decisions relating to desert tortoise management can be made (see Recommendation B-3).

- Throughout the Task Force's investigations, there clearly were unanswered questions in need of resolution concerning many aspects of the desert tortoise and its habitat. These data gaps and unknowns caused the Task Force to develop a list of questions in need of research and study (see Recommendation D and Appendix 2).

- It was abundantly clear throughout this effort that public appreciation and knowledge was lacking concerning the efforts being made for the tortoise, as well as the severity of impacts caused by human actions. Therefore, the Task Force highly recommends that the Bureau undertake a public awareness program to enhance knowledge of the desert tortoise and its needs (see Recommendation E).

- Through the efforts of this Task Force it was found that current planning decisions may not be being implemented at a rate which could benefit tortoise management. There is a need to ensure that implementation of planning decisions is more effective or else the decision should be reevaluated. This includes monitoring the implementation of land-use plan decisions.

A. Provide Coordination Through an Oversight Group

As existing and new information is gathered and management is applied, continual coordination and consultation with the different agencies, universities, and interest groups will be necessary. To ensure standardization of tortoise inventories, monitoring, analysis of information, and different management actions, a coordination group or team should be established.

It is recommended that this Oversight Group include a representative from the following offices:

1. USFWS--Regions I, II, and VI (one from each).
2. BLM--Arizona, Utah, Nevada, and California (one from each state).
3. State Wildlife Agencies--Arizona, Utah, Nevada, and California (one from each state).
4. BLM Washington Office.

The functions of the Oversight Group should include review and direction for implementing actions to ensure continued existence of the desert tortoise. Therefore, the participation from the listed agencies will require decision-level positions rather than technical experts.

It is recommended that the Oversight Group meet once annually. The following is a list of general topics, the status of which should be reviewed by the Oversight Group:

1. Standardization of procedures for the analysis and interpretation of tortoise information.
2. Report on management actions completed for the benefit of the desert tortoise.
3. Funding priorities.
4. Identification of areas lacking sufficient inventory and monitoring information for management of Category 1 and 2 tortoise habitat.
5. Research needs to resolve management issues.
6. Current and historical threats, impacts, and conflicts.
7. Completion of annual status or progress report (possible Memorandum of Understanding).
8. Existing laws and guidance.
9. Ongoing research.

It is also recommended that each state formulate, if not already in existence, a Coordinating Committee. These groups should include all parties with knowledge and interest in managing the public lands. These Coordinating Committees would tend to be more technical than management oriented. The primary function of these groups should be to advise the local manager or State Director on preferred techniques or actions which would enhance management by the individual office of desert tortoise habitat. Additional functions of these groups would be to advise the Oversight Group of the status of implementation actions, as well as to represent those actions to other interested parties.

B. Standardize Inventory, Monitoring, and Analytical Procedures

1. Inventories

Population inventories of tortoises should be conducted according to the transect method used by Berry (1984a, Chapter 2). Arizona methodology should initially follow Burge (1980). This technique should serve well in early stages of investigations of local tortoise abundance and distribution over broad habitat areas.

At the present time, spring census of 1 sq. mi. plots is the preferred method for determining densities of tortoises (Berry 1984a, Appendices 2 and 3). This method of inventory should be used to better define specific population data, such as age and sex composition of the population, productivity, mortality rates, etc.

2. Monitoring

It is recommended that monitoring studies[1/] be established in all desert tortoise habitat areas. These studies should be established in crucial habitat areas first, with noncrucial habitat areas taking second funding priority.

Methodology for establishing monitoring studies should be the same as the above-mentioned inventory plots. Monitoring plots should be read at least every 5 years. Vegetation monitoring should also be conducted using standardized procedures in concert with tortoise plot studies.

3. Analysis

Considerable information has been gathered on the desert tortoise in California, Nevada, Arizona, and Utah. Presently, much controversy has arisen as a result of attempts by Federal and state agencies, universities, and professional organizations to interpret tortoise information. The primary issue which arises is the extrapolation of data from small sample size to large expanses of habitat. Also, there has been bias in placement of transects and study plots. In order to utilize to the greatest extent information gathered in the past, along with all future studies, a standardized process of analysis and interpretation should be established which limits the extrapolation of data to areas of appropriate validity. There also should be an expansion of transects and plots to allow random sampling.

It is recommended that a special Coordinating Committee comprised of representatives from BLM, USFWS, state wildlife agencies, universities, and professional organizations be organized to establish a methodology for ensuring a consistent approach to analyzing and interpreting tortoise information. If this type of organized effort fails, the Bureau should contract with several university professors to establish this methodology.

C. Designate and Categorize Management Areas

It is recommended that all tortoise populations be delineated by habitat management areas within each state. These tortoise habitat areas are to be described and categorized to reflect their relative importance for identification of the need for and implementation of positive management actions.

1/ "Monitoring" involves inspection of condition and trend of resources which may be affected by an action. This inspection is generally conducted in accordance with established intervals and standards (and at other times as appropriate) to determine whether there is sufficient cause to warrant amendment or revision of the plan (43 CFR 1610.4-9) or notification of noncompliance with mitigation measures stipulated in land-use authorizations.

General criteria should be developed to categorize tortoise habitats on all BLM lands within the range of the desert tortoise. Tortoise habitats thus categorized will aid in the timely application of management actions to protect or improve them.

General criteria include, but are not limited to, the following factors:

1. Manageability
   a. Conflicts
   b. Land tenure

2. Population
   a. Status
   b. Trend

3. Habitat
   a. Status
   b. Trend

In consideration of these three factors, populations and habitats reflect symptoms of the tortoise resource management problem; the manageability factor focuses on problems requiring resolution. With this in mind it is imperative that the major emphasis be directed toward influences most affecting manageability.

Desert tortoise habitat areas will be categorized by using the following prescription:

Category 1 Habitat Areas

1. Contain medium to high densities and mostly healthy, vigorous populations;

2. Populations exhibit stable to increasing trends;

3. Habitat condition variable, with stable to decreasing trends;

4. Conflicts resolvable;

5. Essential to the maintenance of viable populations; and

6. Management emphasis to protect existing habitat values and improve any recognized deficiencies.

Category II Habitat Areas

1. Contain medium to low tortoise densities, but usually below the level expected;

2. Population trends stable to decreasing;

3. Habitat generally below potential in condition and with declining trend;

4. Conflicts resolvable in most cases;

5. Important, but may not be essential to the maintenance of a viable population; and

6. Management emphasis to maintain habitat to halt any further decline in population density and distribution.

Category III Habitat Areas

1. Contain tortoise densities far below habitat potential or characteristically of the low density; includes low habitat potential areas found naturally on the outer fringes of their distribution;

2. Population trends stable to decreasing;

3. Habitat condition stable to decreasing with trends declining;

4. Little or no influence on the maintenance of viable populations;

5. Conflicts variable in extent and intensity; and

6. No special management emphasis.

Categorization of tortoise habitat areas as recommended herein is intended to provide guidelines for decisionmakers. It is not intended to be a "cookbook" formula.

D. Conduct Additional Research and Studies

Thirteen subject areas where research and/or study are lacking or insufficient are listed in Appendix 2. Note that research needs vary from state-to-state and will vary through the years as program needs and funding emphases change.

It is recommended that the proposed Desert Tortoise Oversight Group develop a long-term plan for funding tortoise research. Because four states are involved, Bureau funding should be allocated at the Washington Office level. BLM funds other than MLR base funds should be sought through special Congressional appropriations, state-Federal matching funds, and other non-Bureau sources (cost-reimbursable environmental analyses, contributed funds, etc.). Expenditure of state, other Federal, and private research funding should follow guidelines agreed to in the proposed long-term plan.

E. Increase Public Information Efforts

Each state should develop a public affairs plan to inform the public that desert tortoises and their habitats are fragile. It should include, but is not limited to, laws concerning "removal" and care of habitat, posters for distribution to schools in tortoise areas, slide series for formal presentation, and other publicizing of the positive management actions currently under way to benefit the

tortoise. The Secretary's campaign to involve private citizens in public land management should be a part of the effort to protect the desert tortoise and its habitat.

F. Provide Increased Emphasis on Tortoise Habitat Management

The management actions below are currently at issue and in need of attention:

Priorities	Action[1/]
1	Implementation of management actions.
1	Inventory of areas where no inventory exists.
1	Categorization of habitats as herein recommended.
1	Monitoring of existing study plots and established transects.
2	Analysis of existing data following establishment of common criteria.
3	Additional research and studies as herein recommended.
4	Public information and technology transfer.

1/ All actions include computer-compatible data analysis, tracking, and reporting.

V. LITERATURE CITED

Berry, K.H. (ed.) 1984a. The status of the desert tortoise (Gopherus agassizii) in the United States. Report to U.S. Fish and Wildlife Service. Order No. 11310-0083-81. 838+pp.

Berry, K.H. 1984b. Avian predation on the desert tortoise in California. Report to Southern California Edison Co., Rosemead, CA. and J. Wildl. Manage. (In press.)

Berry, K.H. 1986. Incidence of gunshot deaths in the desert tortoise populations in California. Wildl. Soc. Bull. 14:127-132.

Berry, K.H., T. Shields, A.P. Woodman, T. Campbell, J. Roberson, K. Bohuski, and A. Karl. 1986. Changes in desert tortoise populations at the Desert Tortoise Research Natural Area between 1979 and 1985. Unpubl. Rep. U.S. Bureau of Land Management, Riverside, California. 47 p.

Berry, K.H., L.L. Nicholson, S. Juarez, and A.P. Woodman. 1986. Changes in desert tortoise populations at four study sites in California. Unpubl. Rep. U.S. Bureau of Land Management, Riverside, California. 39 p.

Burge, B.L. 1980. Survey of the present distribution of the desert tortoise, Gopherus agassizii, in Arizona: additional data, 1979. In: K.A. Hoshagen (ed.), Proc. 1980 Desert Tortoise Council Symposium, Long Beach, California. Pages 36-60.

Burge, B.L. 1982. An evaluation of the transect technique for estimating desert tortoise density at a prospective power plant site in Ivanpah Valley, California. Proc. 1982 Desert Tortoise Council Symposium.

Bury, R.B. 1978. Desert tortoises and off-road vehicles: do they mix? In: M. Trotter (ed.). Proc. 1978 Desert Tortoise Council Symposium, Long Beach, California. p. 126.

Bury, R.B., R.A. Luckenbach, and S.E. Busack. 1977. Effects of off-road vehicles on vertebrates in the California desert. U.S. Dept. of the Interior, Fish and Wildlife Service. Wildlife Res. Rept. 8.

Busack, S.E., and R.B. Bury. 1974. Some effects of off-road vehicles and sheep grazing on lizard populations on the Mojave Desert. Biol. Conserv. 6:179-183.

Fusari, M. 1982. Feasibility of a highway crossing system for desert tortoises. Final Report. California Department of Transportation, Division of Transportation Planning. Res. Rep. No. FHWA/CA/TP-81/1. Sacramento, California.

Hohman, J.P., and R.D. Ohmart. 1978. Historical range use of the Beaver Dam Slope, Arizona, and its possible effects on the desert tortoise population. In: M. Trotter and C.F. Jackson, Jr. (eds.). Proc. 1978 Desert Tortoise Council Symposium, San Diego, California. pp. 116-125.

Hohman, J.P., and R.D. Ohmart. 1980. Ecology of the desert tortoise (Gopherus agassizii) on the Beaver Dam Slope, Arizona. Unpubl. Rep. U.S. Bureau of Land Management, Phoenix, Arizona. Contract No. YA-510-PH7-54.

Hohman, J.P., R.D. Ohmart, and J. Schwartzmann. 1980. An annotated bibliography of the desert tortoise. Desert Tortoise Council Spec. Publ. No. 1. Long Beach, California.

Jennings, R. 1986. Biochemical variation of the desert tortoise, Gopherus agassizii. Master's Thesis. University of New Mexico, Albuquerque. 72 pp.

Medica, P., C. Lyons, and F.B. Turner. 1982. A comparison of 1981 populations of the desert tortoise (Gopherus agassizii) in grazed and ungrazed areas in Ivanpah Valley, California. Unpubl. Rep. U.S. Bureau of Land Management. Contract No. CA 950-1A1-1211. 60 pp. Also: In: K. Hoshagen (ed.). Proc. 1982 Desert Tortoise Council Symposium, Long Beach, California.

Mortimore, C., and Schneider, P. 1984. (Desert tortoise die-off in Piute Valley). In: M. Trotter (ed.). Proc. 1984 Desert Tortoise Council Symposium, Long Beach, California.

Nicholson, L.L. 1978. The effects of roads on desert tortoise populations. Unpubl. Rep. U.S. Bureau of Land Management, Riverside, California. Contract No. CA-060-CT8-000024.

Nicholson, L.L., and K. Humphreys. 1980. Sheep grazing at the Kramer study plot, San Bernardino Co., California. pp. 163-194. In: K.A. Hoshagen and E. St. Amant (eds.). Proc. 1981 Desert Tortoise Council Symposium, Long Beach, California.

Schamberger, M.L., and F.B. Turner. 1986. The application of habitat modeling to the desert tortoise (Gopherus agassizii). Herpetologica 42(2): 134-138.

Turner, F.B., P.A. Medica, and C.L. Lyons. 1981. A comparison of desert tortoises (Gopherus agassizii) in grazed and ungrazed areas in Ivanpah Valley, California. Proc. Desert Tortoise Council 1981 Symp., pp. 139-162.

U. S. Fish and Wildlife Service. 1984. Desert Tortoise Recovery Plan (Beaver Dam Slopes, Utah, Population). Agency Review Draft and Technical Review Draft.

Weinstein, M., F.B. Turner, and K.H. Berry. 1986. An analysis of habitat relationships of the desert tortoise in California. Unpubl. Rep. for Southern California Edison Co., Rosemead, California. 83 pp.

APPENDIX 1

EXISTING LAWS AND GUIDANCE

I. FEDERAL LAWS AND GUIDANCE

The following is further detail concerning the principal laws, regulations, and policies that apply to desert tortoise management.

A. Federal Laws

1. Mineral Leasing Act of 1920, as amended (41 Stat. 437)

a. This act states that deposits of coal, phosphate, sodium, oil, oil shale, or gas, and lands containing such deposits owned by the United States... shall be subject to deposition in the form and manner provided by this act...

b. The Mineral Leasing Act, plus the following listed regulations and operating agreements, provide for protection of all types. of surface resources on lands subject to oil and gas leasing.

c. 43 CFR 3045. Surface Management Requirements for Geophysical Exploration.

d. 43 CFR 3109. Surface Management Requirements for Oil and Gas Leasing.

e. NTL-6 Operating Procedures. Surface operating standards for oil and gas exploration and development.

f. Lease Stipulations. Necessary to protect specific surface resources are provided prior to lease issuance by BLM.

2. Taylor Grazing Act of 1934, as amended. (43 U.S.C. 315; 48 Stat. 1269 (1970)).

a. Requires the Secretary to protect, administer, regulate, and improve grazing districts created in accordance with the Act.

b. Section 2 of the Act also requires the Secretary "...to ensure the objectives of such grazing districts, namely, to regulate their occupancy and use, to preserve the land and its resources from destruction or unnecessary injury, to provide for the orderly use, improvement, and development of the range."

c. Authorizes the Secretary "to continue the study of erosion and flood control and to perform such work as may be necessarily to amply protect and rehabilitate such areas within grazing district."

d. Provides for cooperation with local stockmen associations, State land officials, and State agencies engaged in conservation or propagation of wildlife.

3. Material Sales Act of 1947, as amended (61 Stat. 681).

a. Authorizes disposal of materials including, but not limited to, sand, gravel, stone and common clay on public lands through a sales system.

4. Public Law 167, Multiple Surface Use Act, Act of July 23, 1955 (60 Stat. 367).

a. The act amended the 1872 Mining Law and Material Sales Act. It authorizes the Federal Government to manage and dispose of the surface vegetation resources and other resources on unpatented mining claims. Excluded from location under the mining laws are common varieties of mineral materials such as sand, stone, gravel, pumice, pumicite, cinders, etc.

The above laws, plus subsequent regulations (3600), provide for disposal of common variety mineral materials. All deposits are subject to the NEPA process and adequate measures must be taken to protect, minimize, or correct damage to the environment. No mineral materials are to be sold if it is determined that the aggregate damage to the public lands and resources would exceed the benefits derived from the proposed sale.

5. Fish and Wildlife Coordination Act as amended (16 U.S.C. 661-667e. (1958), 82 Stat. 563).

a. Requires action agency to consult with the FWS and the State species managing agency to develop mitigation or compliance for proposed land-use authorizations.

6. Sikes Act of 1960, as amended (16 U.S.C. 670a-f, 74 Stat 1052, P.L. 93-452, 88 Stat 1369 (1974), P.L. 95-420, and 92 Stat 921 (1978)). The basic intent of Title II was to extend the Sikes Act authority for wildlife program development from strictly military reservations to public lands administered by the U.S. Forest Service and BLM. In essence, it was a congressional mandate for BLM to: ". . . plan, develop, maintain and coordinate programs for the conservation and rehabilitation of wildlife, fish and game."

a. Title I extends wildlife programs on military reservations and provides funding authorization.

b. Title II authorizes the following key elements for BLM wildlife program management.

(1) Cooperative agreements and close working relationships with State wildlife agencies;
(2) Preparation and implementation of joint, BLM-State wildlife agency habitat management plans (HMPs);
(3) Integration of the BLM's wildlife program with the Bureau's planning system, environmental assessment, and public input and review process;
(4) Implementation of on-the-ground wildlife habitat improvement, maintenance, and protection programs;
(5) Protection and management of both Federal and State-listed threatened and endangered species; and
(6) Establishment of a potential hunting and fishing stamp program for State wildlife agencies to use--if and when they deem fit.

c. The mandates of Title II, Section 202(c)(3), of the amended Sikes Act apply to both federally and State-listed fish and wildlife, i.e. all listed animals. Programs planned, developed, maintained, or coordinated by BLM under the Sikes Act for the protection and development of wildlife resources must include provisions for the conservation of federally listed animals and the critical habitats on which they depend. Conservation of such animals and habitats should be a key criterion for mutual BLM/State justification of Sikes Act programs. The law enforcement authority of Sikes Act (Title II, Section 204) is one principal means of protecting federally listed animals and their critical habitats on BLM-administered lands.

d. Bureau directive provides for the amendment and revision of the joint State/BLM developed plans to reflect changes in management direction, issues or potential.

7. National Environmental Policy Act of 1969 (42 U.S.C. 4321-47, 83 Stat 852, P.L. 91-190).

a. Requires Federal agencies to utilize a systematic, interdisciplinary approach to ensure the use of natural and social sciences, and environmental design arts in any planning or decision making that might impact man's environment.

b. Establishes national environmental policy to, among other things, encourage productive and harmonious relationships between man and his environment and to enrich the understanding of ecological systems and natural processes important to the Nation. Wildlife is obviously an important aspect of such systems and processes.

c. Requires preparation of detailed statements on environmental impacts of proposed major Federal actions that significantly impact the quality of the human environment.

d. Directs Federal agencies to initiate and utilize ecological information in the planning and development of resources oriented projects.

e. Identifies the responsibility to preserve the natural aspects of the environment that supports diversity and variety of habitat components.

8. Mining and Mineral Policy of 1970 (P.L. 91-631, 84 Stat. 1876).

a. This law states that it is the continuing policy of the Federal Government in the national interest to foster and encourage private enterprise in:

(1) The development of economically sound and stable domestic mining, minerals, metal, and mineral reclamation industries.

(2) The orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security, and environmental needs.

(3) Mining, mineral, and metallurgical research, including the use and recycling of scrap to promote the wise use of our natural and reclaimable mineral resources.

(4) The study and development of methods for the disposal, control and reclamation of mined land, so as to lessen any adverse impact of mineral extraction and processing upon the physical environment that may result from mining or mineral activities.

9. Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq., 87 Stat. 884, P.L. 93-205, P.L. 94-359, 90 Stat. 913 (1974), P.L. 95-212, 91 Stat. 1493 (1977), P.L. 95-632, 92 Stat. 3751 (1978), P.L. 96-159 (1979), P.L. 97-304 (1982)).

a. Supersedes the Endangered Species Preservation Act of 1966 and the Endangered Species Conservation Act of 1969.

b. Requires all Federal departments and agencies to utilize their authorities to conserve species, subspecies, or populations of plants and animals officially listed by the Secretary of the Interior or Secretary of Commerce as threatened or endangered. All Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the Act.

c. Requires Federal agencies to ensure that the continued existence of listed species is not jeopardized and that designated critical habitat of listed species is not destroyed or adversely modified. Requires consultation on agency actions to ensure that listed species are not jeopardized.

d. Requires consultation with the U.S. Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) if it is determined that any BLM action (e.g., a right-of-way grant) may affect a federally listed species or its critical habitat.

e. Requires conference with FWS if it is determined that an action may affect a proposed threatened and endangered (T/E) species.

f. The appropriate Secretary shall utilize the land acquisition and other authority under the Fish and Wildlife Act of 1956 to acquire by purchase, donation, or otherwise land necessary to conserve wildlife including those listed as T&E. Funds from the Land and Water Conservation Fund Act of 1965 as amended may be used to acquire lands.

g. The Secretary is authorized to enter into a cooperative agreement with States for the conservation of T&E species.

h. Both listed and proposed species are protected under Section 7 of the ESA. Candidate species are not protected but are species that the service is considering for inclusion on the list. According to ESA Sec. 7(a)(4), this is where the desert tortoise currently fits in: as a Category 2 candidate.

10. Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq., 90 Stat 2743, P.L. 94-579).

a. Requires the development and maintenance of land-use plans based on an inventory of all public lands and their resources. Requires that public lands be retained unless it is determined that disposal will serve the national interest.

b. Places fish and wildlife management on an equal footing with other traditional land uses.

c. Requires that part of grazing fees be spent for "range betterment," including aquatic and terrestrial wildlife habitat enhancement, protection, and maintenance where livestock use occurs.

d. Requires consideration of fish and wildlife resources before approval of land exchanges.

e. Authorizes the Secretaries of the Interior and Agriculture to designate areas under their jurisdiction and establish time periods where no hunting and fishing would be permitted for reasons of public safety, administration, or applicable law.

f. Authorizes the designation of Areas of Critical Environmental Concern to protect and prevent irreparable damage to fish and wildlife, and other resources.

g. Neither enlarges nor diminishes the responsibilities and authorities of the State for management of fish and resident wildlife.

h. Authorizes investigations, studies, and experiments--involving the improvements, management, use, and protection of the public lands and their resources.

11. Public Rangelands improvement Act of 1978 (43 U.S.C. 1901 et seq.).

a. Directs improvement of rangeland conditions in accordance with land-use planning under FLPMA. Public rangelands will be managed, maintained and improved so that they become as productive as feasible for all rangeland values in accordance with objectives established in FLPMA.

b. Directs development and maintenance of an inventory of range conditions and trends as part of FLPMA's inventory process. The goal of rangeland management in accordance with the Taylor Grazing Act and FLPMA shall be to improve the range conditions of the public rangelands so that they become as productive as feasible in accordance with the rangeland management objectives established through the land-use planning process, except where the process determines that grazing uses should be discontinued.

c. Requires prior consultation with the FWS, wildlife agencies of the State where animals are located, individuals independent of Federal and State government recommended by the National Academy of Sciences and other individuals having scientific expertise and special knowledge of wild horses and burros, wildlife management, and animal husbandry as related to rangeland management.

d. Provides funding for rangeland improvements which includes providing habitat for wildlife.

B. Executive Orders

1. Executive Order 11514 of 1970 (Protection and Enhancement of Environmental Quality. This Order is in furtherance of NEPA (1969, P.L. No. 91190), whereas the Federal Government shall provide leadership in protecting and enhancing the quality of

the nation's environment. Agencies will monitor, evaluate, and control on a continuing basis so as to protect and enhance the quality of the environment. Such activities shall include those directed to controlling pollution and enhancing the environment . . . Agencies shall develop programs and measures to protect and enhance environmental quality.

2. Executive Order 11644 of 1972 (Use of Off-Road Vehicles on Public Lands). The purpose of this order is to establish policies and provide for procedures that will ensure the con trol of off-road vehicles on public lands to protect resources, promote safety, and minimize conflicts.

Sec 6: The respective agency head shall, where authorized by law, prescribe appropriate penalties for violation of regulations adopted pursuant to the order and shall establish procedures for the enforcement of these regulations. To the extent permitted by law, he may enter into agreements with State or local government agencies for cooperative enforcement of laws and regulations relating to off-road vehicle use.

3. Executive Order 11989 of 1977 (Off-Road Vehicles (ORV)). This order directs heads of Federal agencies to close areas to ORV use whenever it is determined that use of ORVs is or will cause considerable adverse impact on soil, vegetation, wildlife, wildlife habitat, or certain other resources on the public lands. Agencies are also authorized to adopt the policy that portions of the public lands shall be closed to ORVs except for designated open areas and trails.

C. 8LM Manual Section 6840.06 and 6840.3.

It is BLM policy to protect, conserve, and manage sensitive animal species and to use 8ureau authority in furtherance of the purposes of the Endangered Species Act or similar State laws. BLM's responsibility to develop conservation programs for such animals, to ensure their continued existence, or to prevent the destruction or adverse modification of their habitats must be consistent not only with FLPMA, but also with the enabling State legislation.

D. Code of Federal Regulations (43 CFR)

1. 43 CFR 3800,[1] Exploration and Mining, Wilderness Review Program

Using the authority in Sections 302, 601, and 603 of FLPMA, the Bureau has implemented the 3802 regulations, which govern mining activities under the 1872 Mining Law. The regulations establish procedures to: a) prevent impairment of the suitability of lands under wilderness review for inclusion in the

---

1/ 43 CFR 3802 is specific to wilderness study areas and 43 CFR 3809 applies to other than wilderness study areas on public lands.

wilderness system; b) prevent unnecessary or undue degradation by activities authorized by the U.S. Mining Laws; and c) provide for environmental protection of the public lands and resources.

a. Subpart 3802

The 3802 regulations set forth the following requirements for environmental protection (3802.32):

(1) Air Quality. The operator shall comply with applicable Federal and State air quality standards, including the requirements of the Clean Air Act (42 U.S.C. 1857 et seq.).

(2) Water Quality. The operator shall comply with applicable Federal and State water quality standards, including regulations issued pursuant to the Federal Water Pollution Control Act (33 U.S.C. 1151 et seq.).

(3) Solid Wastes. The operator shall comply with applicable Federal and State Standards for the disposal and treatment of solid wastes. All garbage, refuse, or waste shall either be removed from the affected lands or disposed of or treated to minimize so far as is practicable, its impacts on the environment and the surface resources. All tailings, waste rock, trash, deleterious materials or substances, and other waste produced by operations shall be deployed, arranged, disposed of, and treated to minimize adverse impact upon the environment, surface, and subsurface resources.

(4) Visual Resources. The operator shall, to the extent practicable, harmonize operations with the visual resources, identified by the authorized officer, through such measures as the design, location of operating facilities, and improvements to blend with the landscape.

(5) Fisheries, Wildlife, and Plant Habitat. The operator shall take such action as may be needed to minimize or prevent adverse impact upon plants, fish, and wildlife including sensitive, threatened or endangered species, and their habitat which may be affected by the operations.

(6) Cultural and Paleontological Resources. The operator shall not knowingly disturb, alter, injure, destroy, or take any scientifically important paleontological remains or any historical, archaeological, or cultural district, site, structure, building, or object.

(a) The operator shall immediately bring to the attention of the authorized officer any such cultural and/or paleontological resources that might be altered or destroyed by his operation, and shall leave such discovery intact until told to proceed by the authorized officer.

(7) Access Routes. No new access routes that would cause more than temporary impact and therefore would not impair wilderness suitability shall be constructed in a wilderness study area. Temporary Access routes that are constructed by the operator shall be constructed and maintained to assure adequate drainage and to control or prevent damage to soil, water, and other resource values. Unless otherwise approved by the authorized officer, roads no longer needed for operations shall be closed to normal vehicular traffic; bridges and culverts shall be removed; cross drains, dips, or water bars shall be constructed, and the road surface shall be shaped to as near a natural contour as practicable, be stabilized and revegetated as required in the plan of operations.

(8) Reclamation. The operator shall perform reclamation of those lands disturbed or affected by the mining operation conducted by the operator under an approved plan of operations containing reclamation measures stipulated by the authorized officer as contemporaneously feasible with operations.

(9) 3802.4-1 Noncompliance. An operator who conducts mining operations undertaken either without an approved plan of operations or without taking actions specified in a notice of noncompliance within the time specified therein may be enjoined by an appropriate court order from continuing such operations and be liable for damages for such unlawful acts.

b. Subpart 3809, Surface Management.

(1) 3809.0-6. A person has a statutory right, consistent with Departmental regulations, to go upon the open Federal lands for the purpose of mineral prospecting, exploration, development, extraction, and other uses reasonably incident thereto. This statutory right carries with it the responsibility to assure that operations include adequate and responsible measures to prevent unnecessary or undue degradation of the Federal lands and to provide for reasonable reclamation.

(2) 3809.1-6, Plan Approval. The authorized officer shall within 30 days of receipt of a proposed plan of operation, notify the applicant; (5) That the plan cannot be approved until the authorized officer has complied with Section 7 of the Endangered Species Act.

(3) 3809.2-2(d). The operator shall take such action as may be needed to prevent adverse impacts to threatened or endangered species, and their habitat which may be affected by operations.

c. Subpart 8340, Off-Road Vehicles.

(1) This final rulemaking provides for the management of off-road vehicle use on public lands. Implementation of these rules will provide for continued ORV use under conditions that will protect natural resources, be less disruptive to the activities of other uses, and promote safety.

(2) The authorized officer may close trails or areas affected by ORV activities when they cause adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, or wilderness suitability.

d. Subpart 8341.1, Lists Regulations Governing Use.

(1) Applicable State laws and regulations are applied on public lands. No person shall operate an ORV on public lands in a reckless, careless, or negligent manner; or in excess of established speed limits; or while under the influence of alcohol or narcotics; or cause significant damage to or disturbance of the soil, wildlife, wildlife habitat, improvements, or vegetation resources.

e. Subpart 8341.1. Contains stipulations of the conditions of use. It states that no person shall operate an ORV on public lands in a manner causing undue damage to or disturbance of the soil, wildlife, wildlife habitat, improvements, cultural, or vegetation resources. Penalties may be a fine of not more than $1,000.00 or imprisonment for not longer than 12 months or both (8340.07).

f. Subpart 8364, Closures.

(1) The purpose of this regulation is to allow for the temporary restriction or closure of public lands to protect them from the unnecessary destruction of plant and wildlife habitat.

(2) 8364.1. The regulations state in management of lands to protect the public and assure proper resource utilization, public use and travel may be temporarily restricted to prevent unnecessary destruction of plant life and wildlife habitat. Roads, trails, and lands providing access to other public lands may be closed for protection of public lands and resources.

APPENDIX 2

RESEARCH AND STUDIES

The following areas of research and/or study are lacking or insufficient:

1. What are the effects of cattle/sheep grazing on tortoise growth and reproduction? Does livestock grazing physically impair tortoise habitat features (e.g., burrows, shrub cover) such that tortoise populations are negatively affected? What are the effects of livestock grazing restrictions such as those practiced on the California Desert Conservation Area? What happens when cattle grazing is eliminated in good habitat?

   a. Determine to what extent livestock grazing may affect the forage availability to desert tortoises in such a manner so as to impact maintenance, growth, or reproduction .

   b. Further study and evaluate the grazed and ungrazed study plots established in California in 1980-82 and set up more of these studies elsewhere.

   c. Determine the temporal relations of livestock grazing, feeding activity of tortoises, production and chronology of nutrient buildup of forage (grasses, forbs, shrubs), and determination of reproductive investment by tortoises.

   d. Determine the degree to which livestock grazing under various grazing regimes affects the physical habitat of desert tortoises to the extent that desert tortoises are placed at increased risk.

   e. Determine which restrictions on livestock grazing are effective and which are not.

2. What are the nutritional requirements of tortoises for maintenance, growth, and reproduction?

   Basic research on desert tortoise nutrition is needed as a basis for further research into what effects cattle have on the tortoise's ability to satisfy those requirements.

   a. Determine the nutritional forage quantity and quality needs for:

      1) maintenance of adults;
      2) growth of subadults; and
      3) reproduction.

   b. Determine how and to what extent desert tortoises actually obtain these nutrients from their diet in various plant communities and in various stress (disturbance) situations.

3. At what level does off-road vehicle use (free-play and competitive) significantly increase tortoise mortality or decrease tortoise natality? What other effects does ORV use have on tortoise habitat?

   There are extensive ORV free-play areas within the range of the desert tortoise. Observations indicate both direct conflict (e.g., tortoises run over, burrows crushed) and indirect conflict (e.g., reduction in plant cover and forage). Disturbed areas heal very slowly in the desert, and the healing process is not keeping pace with the rate of increased ORV use.

   a. Develop a long-term plan for monitoring increasing disturbances to desert tortoises from ORV use.

   b. Determine the effects on tortoises of various intensities of ORV use.

4. What are the effects on the desert tortoise of fragmentation by major man-made and natural habitat barriers (e.g., freeways, aqueducts, rocky slopes) and minor habitat barriers (e.g., highways, road ways, buried pipelines)? An understanding of the effects of these large and small barriers may lead to management remedies (e.g., providing passageways through the barriers for natural movement, artificially translocating individuals to provide genetic mixing, design and placement of future barriers so that their function as a barrier is reduced). Barriers may also isolate small populations so that they are below the minimum viable size and thus subject to extirpation. This could actually happen even at the center of a large population, depending on the effectiveness of the barrier.

   a. Identify areas of desert tortoise habitat that have been fragmented by highways, power lines, residential and agricultural developments, etc.

   b. Compare tortoise populations in areas fragmented by man-made barriers to populations in naturally fragmented areas and also to undisturbed populations in larger, more continuous habitat.

   c. Determine if seasonal and annual nutritional needs of adult and juvenile tortoises are met in small, patchy, or altered habitat.

   d. Determine seasonal requirements for cover (such as dens, burrows, pallets, foliage) and space (size of range, tortoise density) for desert tortoise, and determine the effects of fragmentation on tortoise cover and space.

   e. Evaluate different types of construction projects and determine the mechanism of fragmentation, the relative effects of the different types of fragmentation, and possible methods of mitigating those effects.

f. Identify the factors that reduce habitat quality by fragmenting habitat to the extent that tortoise populations decline.

5. What are the effects of small (less than 5 acres), scattered habitat disturbances on overall tortoise population density.

Small disturbances not only accumulate, but also might have an effect individually by disrupting natural activities, such as mating, egg-laying, over-summer and over-winter burrowing, etc. For example, if the only appropriate egg-laying site within the territory of a female is destroyed, nesting may fail for that year even though the individual does not starve. This one-time loss of nesting may be very important because 1) young may only survive from occasional years, and 2) the animals are long-lived, so each successful young growing to adulthood may represent many years of breeding.

a. Locate areas where numerous small disturbances have occurred.

b. Compare tortoise population dynamics between such area and undisturbed habitat.

6. What is the minimum number of individuals necessary to maintain a viable population indefinitely?

Most reference indicate that either 40 to 50 tortoises/sq. mi. are necessary in order to maintain a viable population. These figures seem to be based on pure conjecture. Dr. Hartmut Walter of UCLA (an expert in preserve ecology) made a preliminary estimate that about 170 square miles of tortoise density 250 per square mile or greater would be required for a viable preserve. These estimates were based on incomplete information on social behavior, egg surveyorship, mortality rates, etc., but serve to indicate that small preserves may be futile.

a. Determine the minimum number of individuals and minimum habitat size necessary to sustain viable and healthy tortoise populations in a completely isolated colony.

b. Develop a model to predict viability of such a population if disturbed by the types of development and other human activities which occur in the desert.

7. What is the effect of collecting tortoises for pets, etc.?

a. Construct a life table for a tortoise population protected from collecting to calculate the theoretical effect of removing so many tortoises of certain size and sex classes from a given population.

8. What constitutes good tortoise habitat? Are there areas which have potential to support increased numbers of tortoises through the introduction of hatchlings without causing problems with existing populations?

a. Correlate tortoise survey data with data from a comprehensive soil survey.

b. Determine seasonal requirements for cover (such as dens, burrows, foliage) and space (range size, tortoise density) of tortoises.

c. Measure habitat quality relative to desert tortoise needs.

d. Examine non-vegetative ways of determining habitat quality.

   1) Compare juvenile growth (age & size) to physiological health (weight & condition).
   2) Reproductive activity and/or success of desert tortoise.

e. Identify factors that reduce habitat quality to the extent that desert tortoise populations decline. Emphasize work on hatchling and very young tortoises.

9. What are the distinct populations of tortoises as currently distributed? Are all tortoises alike or are there different subspecies which need to be considered in management decisions and strategies?

   Determination of distinct populations is important in placing relative values on populations. This work should be of great interest to population and habitat managers alike, because it may radically affect the way the USFWS acts on the petition to list.

   a. Analyze morphometric data from all the tortoise trend plots throughout the range.

   b. Conduct studies using state-of-the-art techniques for taxonomic research to clarify the systematics of the desert tortoise.

10. What are the causes of unequal sex ratios in wild populations? What do they tell us about the health of the population?

    It is believed that higher nutritional needs for reproduction during the spring places female at increased risk to mortality factors associated with malnutrition,and cattle grazing has been implicated as a stress causing factor during the period of peak energy demand.

    a. Determine the sex ratios for all age classes of tortoise populations under varying degrees of environmental stress and human disturbance.

    b. Determine the extent to which sex ratio is a driving factor for the survival of tortoise populations.

11. What are the effects of Common Ravens and other predators on the desert tortoise? Can Raven predation on young tortoises be reduced effectively?

    Ravens, and some raptors, have been shown to take high numbers of juvenile tortoises in some areas (e.g., Desert Tortoise Natural Area). It is unknown whether this predation factor reduces the population size, but at the levels observed it is likely.

a. Determine whether Raven populations can be effectively controlled where they might be artificially inflated (e.g., around towns, dumps, highways).

b. Determine whether Ravens have increased in numbers during past decades as a response to increased human presence and disturbance in the desert.

c. Determine most humane and legal methods for Raven control.

d. Determine the level of control needed to ensure survival of viable desert tortoise populations.

e. Determine the feeding range of individual Ravens.

f. Determine how Raven food preferences, especially for juvenile tortoises, are learned.

12. What is the survivorship of relocated tortoises?

Agencies, utilities, and other companies have made repeated requests to relocate tortoises away from project sites where surface disturbance will be great (e.g., All-American Pipeline, Luz Engineering solar plant). Previous studies have shown that relocated tortoises may 1) die, 2) move a great distance before settling, or 3) settle near the release sites (Berry 1986). Some of these relocations are now occurring on private lands adjacent to public lands.

a. Study the survivorship, homing capability, movements, and impacts of relocation on released as well as resident tortoises.

b. Determine the characteristics of an acceptable release site area.

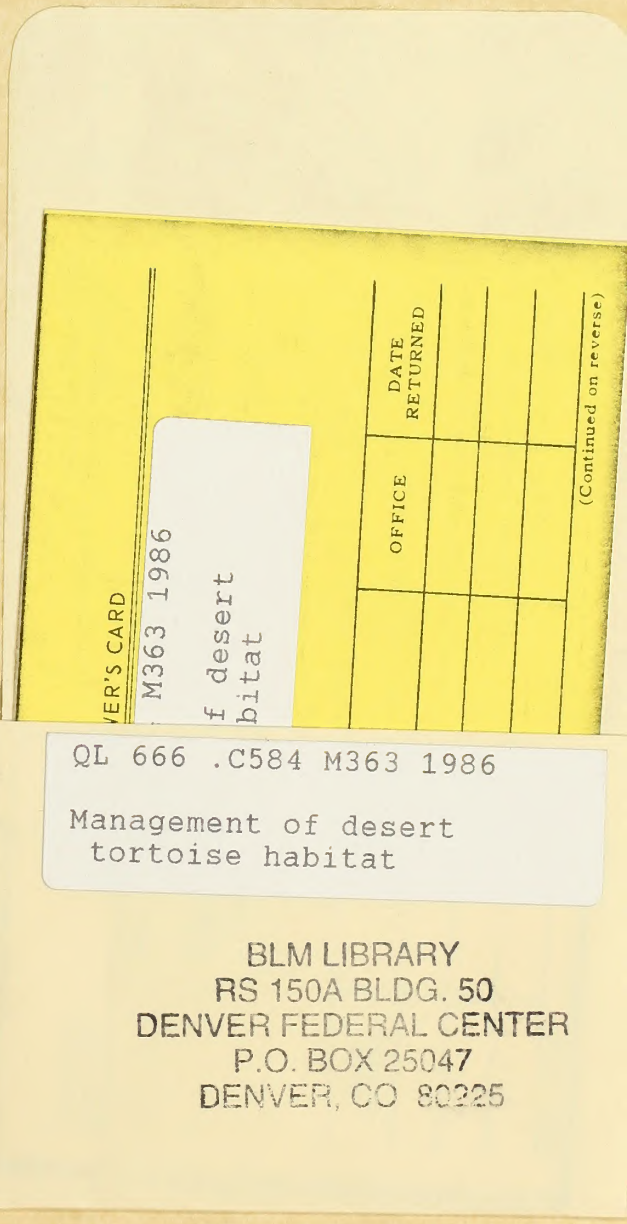
13. What is the survivorship of released captive tortoises and what are the effects of their release on the wild population?

Private individuals are releasing tortoises on public lands. In addition, large numbers are being held by state agencies pending adoption by individuals. There are those interested in returning large numbers of tamed tortoises to the wild. It is important to know the surveyorship of these tortoises for humane reasons and so that we are certain of filling the collecting demand with captives rather than new captures. In other words, if 100 percent of releases die, then it is better to give them to private people who might otherwise collect a wild tortoise and further reduce the breeding population.

a. Investigate the problems of genetic mixing with wild populations, introduction of diseases into wild populations, and the need for conditioning captive tortoises prior to release.

b. Investigate the survivorship of the released captive tortoises both in large blocks of habitat and in fragmented habitats.

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225



QL 666 .C584 M363 1986

Management of desert tortoise habitat

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225